Forestry

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VETERINARY MEDICINE

October 1935

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No. 10

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75 E. Wacker Drive
Chicago, U. S. A.

Junior FORT DODGE
BIO-CHEMIC REVIEW

OCTOBER 1935

PLAN AREA DRIVE PARASITE CONTROL

● Scores of practitioners have successfully conducted area campaigns against horse parasites. Inestimable good has been done.

If you have not engaged in one of these cooperative campaigns, why not plan to do so this year? For the benefits to you, your clients and your community will be manifold. For yourself, the extra fees and increased practice make it an unusually profitable work.

Fort Dodge offers its cooperation in assisting you to plan such an area campaign this coming winter. We offer, without charge, a supply of attractive folders for distribution among the horse owners in your territory. Drop us a post card and let us send you some. You will find them of especial aid in explaining the value of a campaign.

●

PRIZE WINNER

● Be sure to read "The Mare That Didn't Have Tetanus" in the Fall Number of the Bio-Chemic Review. This is the contribution which won our recent contest for descriptions of serious mistakes made in practice.

Near You!

Fort Dodge service blankets the nation with 10 branches, 23 agencies.

CAMERA!

CAT, COAST CUTIE—Canny cameraman catches comely client carrying cub. © Intl.

SCHOOL AGAIN—Young masters and mistresses must desert their pets for "booklarnin'." © Keystone.

DEVELOP PRUSSIC ACID ANTIDOTES

● Two practical antidotes for prussic acid poisoning have just been developed by the Fort Dodge laboratories.

One is Thiadex Solution, the other Nitrose Tablets. Both are specifically valuable and helpful in prussic acid poisoning, and in cases of accidental poisoning with lead and other metallic poisons.

Formulae and dosages are as follows:

THIADEX SOLUTION

[Fort Dodge]

Methylene Blue	1%
Dextrose C.P.	25%
Sod. Thiosulphate	10%
Aqua Dist. q. s.	250 Cc

Dosage: For large animals, 100 to 250 Cc intravenously. Repeat in 6 to 8 hours if needed. Small animal dose in proportion.

NITROSE TABLETS

[Fort Dodge]

Sodium Nitrate	10 gr.
Sod. Thiosulphate	30 gr.
Dextrose C. P.	30 gr.
Methylene Blue	2 gr.

Dosage: For large animals, 4 to 6 tablets in capsule or as a drench. Intravenously, 4 tablets in 4 to 8 ounces sterile water. Repeat in few hours if needed.

Keep a bottle of each of these new antidotes on hand. Order from your nearest Fort Dodge branch or agency.

Veterinary Medicine

Registered in U. S. Patent Office

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D. M. Campbell, Editor A. T. Kinsley, Associate Editor
H. J. Mostyn, R.K.O. Bldg., New York, Eastern Representative

Davison of Montefiore Hospital, New York, has demonstrated that severe vitamin deficiency causes an actual breakdown and death of nerve tissue.

* * * *

Jablons of New York has extracted a definite glandular subject from the kidneys that when injected into laboratory animals causes definite fall in blood pressure and loss of alt from the blood.

* * * *

Mack and Peck of Mount Sinai Hospital, New York, report the cure of chronic nosebleed by injections of snake venom.

* * * *

Investigators at the University of Wisconsin have determined that the availability of iron varies widely in different foods, e. g., only 25 per cent of the iron in spinach, alfalfa and oysters is usable by the body. More than 60 per cent of the iron in heart muscle, liver and soy beans is usable.

* * * *

Nachlas and Shelling of Johns Hopkins University Hospital have worked out a diet and routine of internal medicine that softens the skeletal bones to permit manual correction of deformities, for which surgical treatment is impossible or undesirable. The straightened bones (limbs) are then held in position by casts, while the bones are rehardened.

Dr. Louis Sternberg of Beth Israel Hospital, New York City, concludes as a result of a six-year study of the subject, that persons successfully treated for hay fever during the summer, suffer far less from colds the following winter than hay fever sufferers and others not so treated.

* * * *

Granulocytopenia has come into prominence recently with the use of pain-allaying drugs based on amidopyrine. Squier of Milwaukee does not regard this drug as poison in the ordinary acceptance of the term, but only as a poison to certain highly susceptible individuals and granulocytopenia as an allergic reaction. That is, as belonging to the group of diseases of which hay fever, asthma and hives are examples. Granulocytopenia was the diagnosis in Dr. A. H. Baker's illness and death a few years ago.

* * * *

Conklin of the Macdonald College at Ste. Anne de Bellevue, Quebec, has treated more than 700 animals suffering from various infections by giving intravenous injections of animal charcoal. Results have been highly encouraging. Prompt recovery was attained in various septicemias deemed mortal. Biological findings show that the endothelial cells of the spleen, liver and bone marrow became more active under the stimulus of the charcoal treatment.

J. S. Koen
T. A. Sigler
L. A. Mosher
J. F. McKenna
E. B. Dibbell

Seventy-Second Annual Meeting of the A. V. M. A.

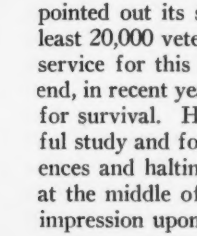
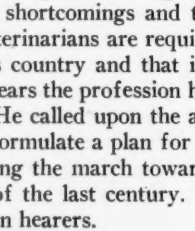
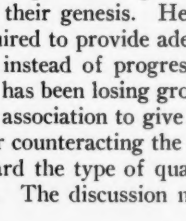
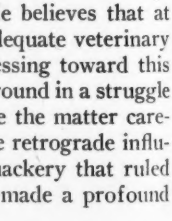
Place: Oklahoma City, Oklahoma.
Date: August 27-30, 1935.
Attendance: 904, from 44 states, Hawaii and two provinces.
Weather: Near perfect.
Arrangements: Excellent.
Banquet: Something new in entertainment.
Program: Fair.
Clinic: Excellent.
Interest: Good.
New President: J. C. Flynn, Kansas City, Missouri.
Next Meeting: Columbus, Ohio.

An old Spanish proverb says: "He who would bring home the wealth of the Indies, must carry the wealth of the Indies with him." Applied to the A. V. M. A. meetings this probably implies that he who would profit much from a scientific program must be prepared for it, must be aware of what is doing in his profession, must be scientifically up to date. Our programs are pretty technical. The moral seems, be familiar with the current literature of the profession; be a reader of veterinary periodicals.

All enjoyed themselves at the Oklahoma meeting. The friendliness of the veterinarians of the Southwest charmed visitors from other sections of the country. This is not the place to reproduce even in abstract form the many papers presented on the program; but some of the more unusual may be mentioned, and among such papers that of Dr. L. A. Merillat of Chicago, easily stands first.

Starting with the premise that the veterinary service of the United States is inadequate, inefficient and unsatisfactory, Doctor Merillat rehearsed its development during the past three-quarters of a century, pointed out its shortcomings and their genesis. He believes that at least 20,000 veterinarians are required to provide adequate veterinary service for this country and that instead of progressing toward this end, in recent years the profession has been losing ground in a struggle for survival. He called upon the association to give the matter careful study and formulate a plan for counteracting the retrograde influences and halting the march toward the type of quackery that ruled at the middle of the last century. The discussion made a profound impression upon hearers.

E. C. Jones B. T. Sims Geo. H. Koon N. L. Townsend C. F. Schlotthauer

C. C. Hisel Hamlet Moore C. J. Marshall L. J. Kepp N. C. Spaulding

COL. ROBT. J. FOSTER, head of the Army Veterinary Corps, delivered an encouraging message. According to Colonel Foster, with the number of public animals decreasing, the Veterinary Corps finds its work extending to a point where veterinary reserve officers have had to be called into active service for extended periods. In addition to the 126 veterinary officers in the Regular Army, 83 veterinary reserve officers are now on active duty; all engaged in food inspection for the CCC camps. Colonel Foster expects that 50 additional veterinary reserve officers will be required at an early date.

DR. A. E. WIGHT, of the Bureau of Animal Industry, discussed the rapid development of the Bang's disease project under the provisions of the LaFollette amendment to the Jones-Connelly Act of 1934. In the beginning, it was planned to make not more than two tests in herds with funds supplied by the Federal government, but the work has been extended to include four tests where the disease is found, and not more than two negative tests. Reports of retests are encouraging. On initial tests, the average number of diseased animals found has been 15 per cent. On the first retest, this percentage has fallen to an average of four per cent. The area plan, used successfully in the TB eradication project, has been tried in two counties in Virginia and so far has been satisfactory. Oregon will soon try the area plan of testing, using the county as a unit in a considerable number of counties.

Doctor Wight concluded with the statement that vaccination against Bang's disease gives promise of being useful and studies are progressing in field experiments.

THE report of Dr. J. S. Koen, Chairman of the Special Committee on Food Hygiene, was a surprise to many who have regarded Federal meat inspection as so well established, so wholly satisfactory, so meritorious and so beneficial from every point of view that no influence could successfully attack it or undermine it.

The report showed that Federal meat inspection is losing ground. Under the meat inspection act of 1906, certain exemptions are permitted; among others, exemption for farmers slaughtering animals on the farm and wishing to transport the carcasses interstate. The motor truck has brought about a great change in farm slaughtering. Before its advent, the number of animals slaughtered on farms and hauled across state lines was small. At the present time, this type of slaughtering is carried on extensively. The Secretary of Agriculture

N. J. Pyle
A. E. Wight
I. E. Newsom
S. E. Hershey
G. A. Dick

D. B. Palmer
S. L. Stewart
A. T. Kinsley
R. Fenstermacher
E. T. Hallman

has ruled that anyone living on a plot of five and one-half or more acres and carrying on slaughtering of animals, either in person or under his supervision, either animals of his own rearing or animals purchased, is entitled to farmer exemption under this act. This type of slaughtering is increasing rapidly and has reached a point where the larger packers are contemplating the purchase of small "farms" near their present plants erecting abattoirs and handling the slaughter of calves in this way.

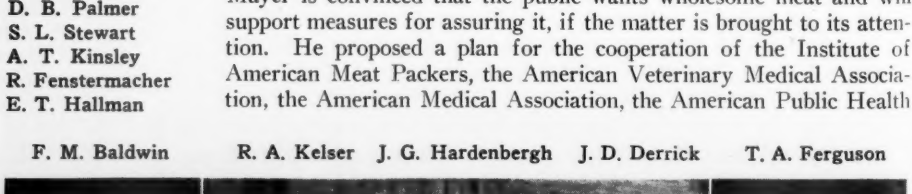
A single instance may be cited of what is going on all over the country. A Wisconsin "farmer" kills a truck load of calves daily (6,000 pounds) and sends it to Chicago. These carcasses reaching Chicago may be processed in any way and shipped anywhere in interstate commerce under the farmer's exemption. Naturally, none of this meat receives any inspection, Federal, state of municipal, and just as naturally, obviously diseased animals that would be rejected on antemortem inspection at establishments where inspection is maintained, or animals too badly diseased to ship to market, gravitate to such slaughtering plants.

A vast amount of swine slaughtering (estimated at 25 per cent of all swine slaughtered) that formerly was under Federal inspection is now without any inspection. The processing tax on hogs is, in the main, paid only by the large packers. The pork bootleggers or dealers in hot pork are about as numerous already under the AAA. as the original bootleggers became under the prohibition amendment. It is estimated that in the first six months of this year the government lost 20 million dollars through the evasion of the processing tax in this manner.

For the hot pork situation there appears no remedy, but a discontinuance of the processing tax. For abuses arising under exemptions for the interstate transportation of uninspected meat, an amendment to the meat inspection act, bringing it up to date and in keeping with modern means of transportation, seems desirable.

THE extension of Federal inspection or state inspection of equal quality to all meat offered for sale in the United States was presented by Oscar Mayer, meat packer of Chicago, in one of the most important discussions ever presented at an A. V. M. A. convention. Mr. Mayer is convinced that the public wants wholesome meat and will support measures for assuring it, if the matter is brought to its attention. He proposed a plan for the cooperation of the Institute of American Meat Packers, the American Veterinary Medical Association, the American Medical Association, the American Public Health

F. M. Baldwin R. A. Kelser J. G. Hardenbergh J. D. Derrick T. A. Ferguson



L. E. Day H. L. Darby N. S. Mayo J. L. Axby A. H. Quin

Association and allied interests for the promotion of a meat inspection act that would provide that the Federal government defray half the cost of state meat inspection, provided the states adopt and maintain a system of meat inspection for all meat slaughtered for sale within the state, equal to that of the Federal government for meat slaughtered for interstate commerce. Such a plan is feasible and Mr. Mayer believes that many of the states are ready for it and that others will adopt it speedily. The present Federal meat inspection costs about six million dollars annually and Mr. Mayer estimated that complete inspection of all meats slaughtered for sale in all states, might cost an additional eight million dollars; but, like the Federal meat inspection, would be worth the cost and more.

House of Delegates

The House of Delegates functioned at this meeting for the second time and as was forecast by the poor beginning it made a year ago, bogged down completely. Its inability either to accept or reject a classification of the veterinary colleges is an example. For five years the Committee on Education has urged this measure; for even longer, the association has favored it. Three years ago (at Atlanta) the recommendation of the committee to this effect was approved. At Chicago, the association, plainly displeased at the delay, voted that the classification be made forthwith. A year ago, at the New York meeting, the House of Delegates postponed action on the matter for a year. At the recent meeting, it took the same action. It is safe to say that no new evidence for or against the classification of veterinary colleges has been presented since the Atlanta meeting three years ago, or is likely to be presented next year or the next. All except members of the House of Delegates seem to have reached a decision in the matter. The delegates seem incapable of making up their minds one way or the other.

In the meantime, if the committee is right, several hundred veterinary students are receiving an inadequate training; in a measure, wasting their time and money and jeopardizing the interests of the veterinary profession of the future. If the committee is wrong, a number of the schools are being unnecessarily harassed. Action is called for. Postponement is pusillanimous.

Koen Selects a Fifth President for the A. V. M. A.

Two nominees for president were presented for the consideration of the association, C. C. Hisel, State Veterinarian of Oklahoma, and J. C. Flynn, small animal practitioner of Kansas City. The vote was

U. E. Marney
M. F. Barnes
F. E. Beaudette
O. A. Longley
T. W. Munce

I. B. Boughton
S. N. Smith
A. R. Glaisyer
L. A. Merillat
Ashe Lockhart

light, but the contest was close; Hisel receiving 159 votes and Flynn, 175 votes. Doctor Hisel was placed in nomination by J. L. Axby, State Veterinarian of Indiana, and Doctor Flynn by J. S. Koen of Chicago. It will be recalled that Doctor Koen was principally responsible also for the election of A. T. Kinsley, W. H. Welch, L. A. Merillat, and T. A. Sigler.

The vice-presidents selected, in order from first to fifth, are: S. W. Haigler, St. Louis; Geo. A. Dick, Philadelphia; E. B. Dibbell, Baltimore; A. A. Husman, Raleigh; and A. R. Glaisyer, Kalaheo, Hawaii. M. Jacob, Knoxville, Tenn. was re-elected treasurer for the nineteenth consecutive term. H. Preston Hoskins was reappointed secretary-editor.

The Clinic

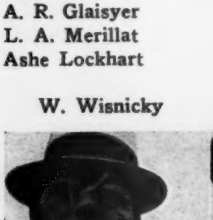
No one in Oklahoma had more troubles, nor enjoyed his troubles so much as S. L. Stewart, Chairman of the Clinic. His troubles, however, were mostly imaginary, since the clinic was held in a perfect setting in the colosseum at the Stock Yards, and was remarkably well arranged. The small animal clinic attracted and held the largest crowd. The equine clinic was a close second; and both were far in the lead of the others. Apparently, interest in cattle, sheep, swine and poultry, in the nutritional exhibits, in the milking machine exhibit and the x-ray was at a low ebb. The laboratory section attracted a constantly changing group of no mean proportion. The pathological exhibit of fresh specimens selected in the various packing houses, while not the most extensive, was undoubtedly of the highest quality yet shown at an A. V. M. A. meeting. It did not attract the attention it deserved. The DeLaval milking machine exhibit was much the same as the one shown at Kansas City and described fully at that time (Vet. Med., Oct. 1931, page 422).

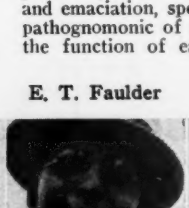
The vitamin exhibit by the University of Illinois, in charge of Prof. Fairman and Doctor Graham, was remarkably complete and informative. The following information was given those visiting the exhibit:

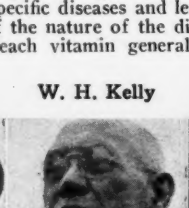
Animal Avitaminoses (Hypovitaminoses)

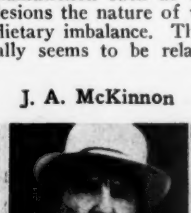
Vitamins are nutrients indispensable to animal life and health. They are organic compounds but evidently of varied chemical character. They occur in vegetable and animal food materials in extremely small concentrations, and the amounts needed daily by animals are so small as to require for their expression the smallest unit of weight, the microgram, equal to one thousandth of a milligram, one 65 thousands of a grain, or one 28 millionth of an ounce. Their absence from or serious deficiency in the rations of animals produces, besides general signs of malnutrition such as failure of growth and emaciation, specific diseases and lesions the nature of which is generally pathognomonic of the nature of the dietary imbalance. This is true because the function of each vitamin generally seems to be related more or less

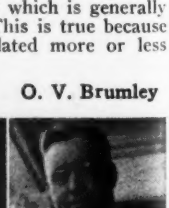
W. Wisnicky E. T. Faulder W. H. Kelly J. A. McKinnon O. V. Brumley







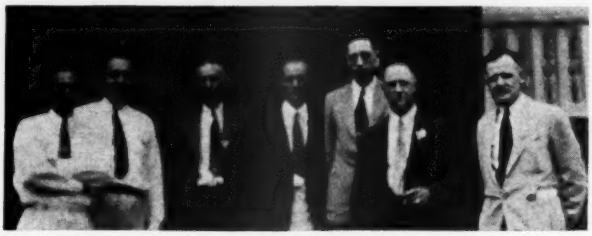




A. A. Husman Cassius Way M. Jacob H. M. Kalodner C. H. Hays

specifically to some one tissue or organ in the body, such as the epithelial tissue (vitamin A), the intercellular substance of the blood vessels (vitamin C), the nervous system (vitamin B), the reproductive organs or their proper functioning (vitamin E), or the development of the bones (vitamin D). The diseases resulting from deficiencies of vitamins in the diet are called avitaminoses, and are distinguished from each other by appending a letter indicating the vitamin with respect to which the diet is deficient, such as avitaminosis A.

Vitamins are so widespread in whole grains, properly cured hays, and well



SMALL ANIMAL PRACTITIONERS
Left to right: Drs. S. W. Haigler, St. Louis; L. H. LaFond, Detroit; J. V. Lacroix, Evanston, Ill.; M. L. Morris, Stelton, N. J.; D. A. Eastman, Moline, Ill.; Frank E. McClelland, Buffalo, and A. R. Theobald, Cincinnati.

nourished forage crops and vegetables, that animals which receive a varied diet are usually able to secure the vitamins which are necessary for the maintenance of their health in adequate amounts. However, under certain conditions, vitamin deficiencies may present important clinical problems to veterinarians and stockmen. These conditions include particularly the exclusive feeding of grains and grain products, subsistence upon poorly cured hays or upon stunted or "burned" pastures, and the rearing of young animals under shelter with no access to sunlight.

Low vitamin levels in the ration may affect the health of animals in a non-specific manner. This may be of greater economic significance than the typical avitaminoses. While the latter enable an early diagnosis and prompt treatment by the adoption of the indicated preventive measures, the non-specific disturbances of health present an obscure diagnostic problem and may terminate in losses from a variety of intercurrent infections. However, as in contagious bacterial and filterable virus diseases of animals, avitaminoses, whether specific or non-specific in character, are more effectively and economically prevented than cured. An impaired resistance to infection has been demonstrated, in animal experiments, to result from the continued feeding of diets deficient in either vitamin A or vitamin C, and, less generally, vitamin B. However, the addition of any one or all of the vitamins to a ration already containing adequate amounts of them, cannot be expected to increase the resistance to infection or to combat an infection already present.

In addition, charts were distributed, compiled from original sources for the purpose of helping the clinician in the diagnosis and treatment of vitaminoses.

In suggesting treatment it is not intended to convey the idea that avitaminoses or hypovitaminoses in animals may be dramatically cured by

C. D. Carpenter
I. S. McAdory
F. D. Patterson
O. J. Kron
E. A. Davis

EARLY ARRIVALS
Dr. and Mrs. Chas. W. Bower, Topeka, Kans.

supplying the essential vitamins. In fact, avitaminoses of different types accompanied by lowered resistance and secondary bacterial infections, as well as advanced stages of uncomplicated vitamin deficiency, may present a complex syndrome which responds only slowly or not at all to the indicated nutritional treatment. It is important for the clinician to realize that symptoms of infectious diseases very frequently simulate avitaminotic symptoms, so that the latter can be diagnosed as such only when the ration upon which the animal is subsisting is obviously or probably deficient.

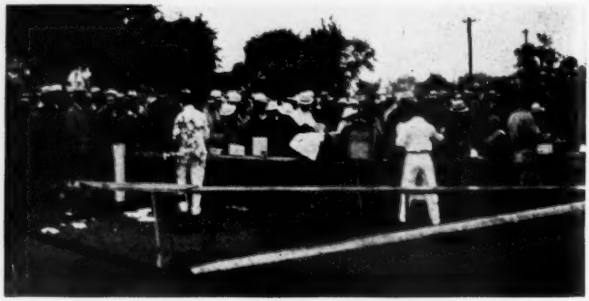
It was understood that the University will supply these charts to interested veterinarians at their request.

Commercial Exhibits

The commercial exhibits did not differ in number or kind, except in detail, from those of the International Veterinary Congress last summer, which were described at that time (Vet. Med., Jan. 1935, pages 42-48).

EVERYONE HAD A GOOD TIME
Dr. and Mrs. Hugh M. McConnell, Independence, Missouri, Exemplify It.

The weather man was kind to the veterinarians who visited Oklahoma City the last week in August, and with one exception, arranged everything to the satisfaction and gratification of everyone. That mistake, however, was serious. We do not know whether it was made by the local committee in scheduling an outdoor program for Thursday afternoon, or by the weather man in scheduling rain for that period. At any rate, the arrangements conflicted and the convention lost out, for the afternoon spent



The Barbecue Supper at Fort Reno.

at the Remount Breeding Station at Fort Reno was just about a total loss. An excellent program, a demontration of the methods and achievements of the army's horse breeding experimental station at Fort Reno had been arranged. Despite the inclement weather, about 400 made the 40-mile journey to visit this station, and by standing in a chilly, drizzling rain, were able to see the stallions, mares and foals and to hear some explanation of the army's methods. An outdoor barbecue supper had been arranged, but the increasing rainfall as the afternoon wore on, drove most of the visitors back to the city for their dinners.

Banquet

The banquet was well attended, the food was good, Dr. R. Fred Eagle of Chicago, formerly superintendent of Wilson and Company's packing plant at Oklahoma City, officiated as toastmaster to the satisfaction of every one, professional entertainers furnished the amusement, and best of all *the meeting adjourned before eleven o'clock,*— a model for other banquet committees.

In connection with clinical work on behalf of animals and birds, the Council of the R. S. P. C. A. have definitely decided that only fully qualified veterinary surgeons shall be employed.—*Royal Society for the Prevention of Cruelty to Animals.*

* * * *

There are more than 1400 R. S. P. C. A. Painless Destruction Centers in operation in England, at which tens of thousands of animals are "destroyed" annually. It recommends but three lethal agents; humane killers for large dogs, chloroform for small dogs and cats, and coal (illuminating) gas where the number of animals to be killed is large.

* * * *

A veterinary surgeon nominated by the local division of the National Veterinary Medical Association of Great Britain and Ireland should serve on each clinic committee with the object of enabling the committee to administer the institution (R. S. P. C. A. Animal Clinic) with the assistance of professional advice, and also that the public may realize that the institution is a joint undertaking between the R. S. P. C. A. and the veterinary profession.—*R. S. P. C. A. Booklet.*

* * * *

Recent first hand observations by keen horsemen, indicate there is a real increase in foals dropped in 1935. It is probable that the U. S. Department of Agriculture estimates (based on about 160,000 reports) on January 1, 1936, will show 900,000 living horse and mule foals, dropped in 1935. This will still be below the death loss — which probably will be 1,100,000 this year—but it does indicate that we are fast recovering, and that probably births will equal deaths by 1938. When farmers everywhere begin to raise foals, as they are doing now, it will not take long to catch up, for we have over 5 million mares of breeding age, and if even 3 million of them were bred, we would have around 1½ million foals—about as many as we had in 1919. It won't be long till we do have them.—*Wayne Dinsmore.*

The best and most economical poultry laying house for 500 birds is a two-floor (story) house, 30x30 feet; for 800 to 900 layers, a two-floor house, 40x40 feet, and for 1,200 to 1,400 layers, a two-floor house, 40x60 feet.—*Ohio Agr. Exp. Sta.*

* * * *

The average poultry house has about four times too much window space. In one-story buildings, the allowance should not exceed one square foot of window area to 50 square feet of floor space. The average laying house has one square foot of glass to 10 to 15 square feet of floor. Windows act directly opposite to insulation. Why go to the expense of insulation if the effect is to be offset by needless window space. Restricted light has the further advantage of reducing liability to the vice of feather pulling and cannibalism.—*Ohio Agr. Exp. Sta.*

* * * *

Dr. Eugene Dubois, eminent anthropologist, discoverer and describer of *Pithecanthropus erectus,* the most primitive known fossil man, states that the relative cranial capacity of the white man of Europe and of the Australian bushmen, the most primitive of living humans, is the same. The average skull capacity of the European white male is 1450cc and of the female 1300cc. When the lesser structure and softer muscles the brain is called upon to manage in the female are taken into consideration, these "cephalizations" figure equal. The Australian black male has a cranial capacity just under 1300cc and the female 1150cc. Again, when allowance is made for differing body size and structure, these cephalizations are equal, and also equal to that of the whites. The same parity exists in the case of Japanese, Eskimos, and even in the extinct Neandertal race. Doctor Dubois therefore concludes: "It again bears evidence that man did not gradually progress in human organization; but came into existence as one finished genus, and that indeed all the multiform types of man, in the present and in the past, belong to one and the same stage of natural animal organization."

Bone Weakness Due to Nematode Infestation in Animals on Ladino Clover Pasture

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Division of Animal Industry
California Department of Agriculture

LADINO clover, if properly utilized, is one of the greatest development of California agriculture in the last decade. Such pasture furnishes green feed when most of the other pastures are drying up. Many of the native grasses, which mature in early summer, have sharp awns of stickers, which irritate the mouth and skin sufficiently to interfere with normal gain. Ladino has enormous carrying capacity—far superior to alfalfa, without the added cost of haying.

Losses recently occurred among cattle and sheep feeding on certain ladino fields. The symptoms were manifested by broken ribs and long bones of the body, as well as weakness, emaciation, and severe diarrhea.

For convenience this discussion is divided into three parts, designated ranches A. B, and C.

Ranch A

Ranch A has been in ladino clover for three years. No trouble was experienced until the latter part of the second year. At that time there were 1400 ewes and their lambs on this feed. The ewes started scouring, becoming weak and emaciated. They were treated with "Cunic" mixture (4 oz. copper sulphate, 3 oz. blackleaf 40 in three gallons of water — dose 1½ to 2 oz. to lambs and 3½ oz. to ewes) followed in two weeks with Nema capsules. They responded nicely to the treatment. About three months later the trouble again developed and the animals were retreated as above with similar results. Shortly thereafter the ewes were sold and the lambs held on this feed. Deaths in this ewe flock had been about 100 animals. In about thirty days the lambs showed the same symptoms as the ewes and in addition many of them were lame. They were treated again with tetrachlorethylene. The response was not satisfactory and at the end of sixty days over two hundred of the lambs were down, many more were lame, and spontaneous fractures of the leg bones, especially of the femur and humerus, occurred frequently.

Autopsies at this time showed 100 per cent of the lambs with from six to twenty broken ribs. Some ribs were broken in two, three, and four places. See Fig. 1.

On longitudinal and cross sections of the long bones many abnormalities were apparent. The shaft walls were very thin and practically all of the bone building matrix had disappeared. The marrow was almost colorless. The epiphyses were soft and showed a poor line of demarcation. See Figs. 2 and 3.

The lambs were heavily infested with lung worms, *Dictyocaulus filaria* and gastro intestinal nematodes, *Ostertagia, Trichostrongylus, Nematodirus, Trichuris,* and *Chabertia.* A mineral mixture of mostly calcium phosphate and spent bone black was supplied. The lambs took this readily and showed a definite temporary improvement. In about thirty days following the administration of this mixture, the lambs again started scouring and it was necessary to treat them for parasites. The "Cunic" mixture was used. Most of the lambs then fattened and were sent to the butcher. The death loss was about one hundred head.

Ranch B

Eight hundred and twenty-five ewes, aged five and six years, were placed on a four-year-old ladino clover field in December, 1934. Deaths started in January. They lambed in March, producing only five hundred twenty-one lambs. By April the ewe loss totaled 225 and 100 ewes were in the hospital band. See Fig. 4 (the harvest of hides). Treatment has been tried in a more or less hit and miss manner. No definite sys-

tem was followed. The parasite treatment generally was given in doses so small that very little was accomplished. One ewe submitted for autopsy was heavily infested with coccidia.

The ewes were weak, emaciated, and scouring badly. See Figs. 5 and 6. Autopsies showed them to be heavily infested with lungworms, *Ostertagia, Trichostrongylus, Nematodirus, Trichuris,* and *Chabertia.* Coccidia also were quite generally found.

In May the lambs were dying. Autopsies showed the same parasites as those found in the mothers.

Routine treatment with the "Cunic" mixture every fourteen days was then put into practice. After the third treatment, tetrachlorethylene was given. The death loss ceased, and the ewes showed decided improvement. The lambs started to improve in physical condition as a result of the increased milk flow and the decrease in parasites. In six and one-half months the death loss in this band was more than 250.

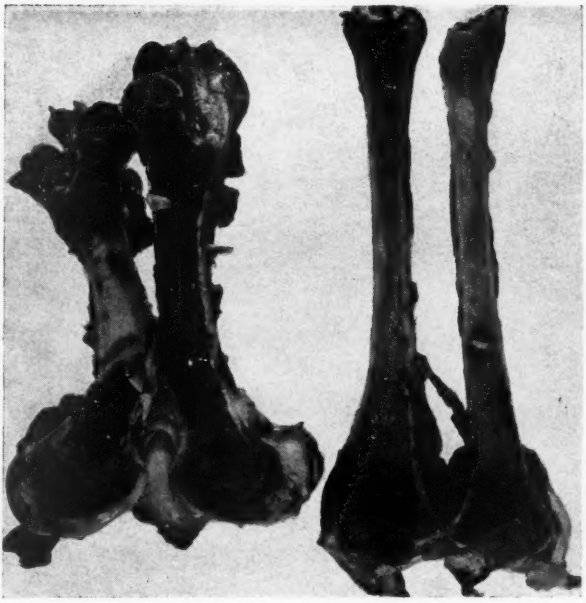


Fig. 2.

Fig. 1.

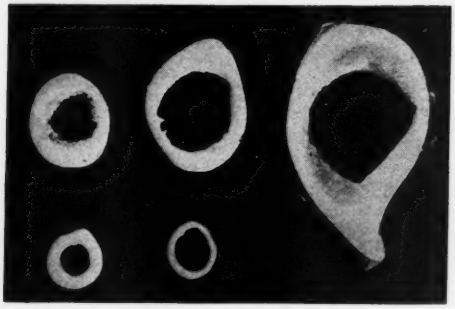
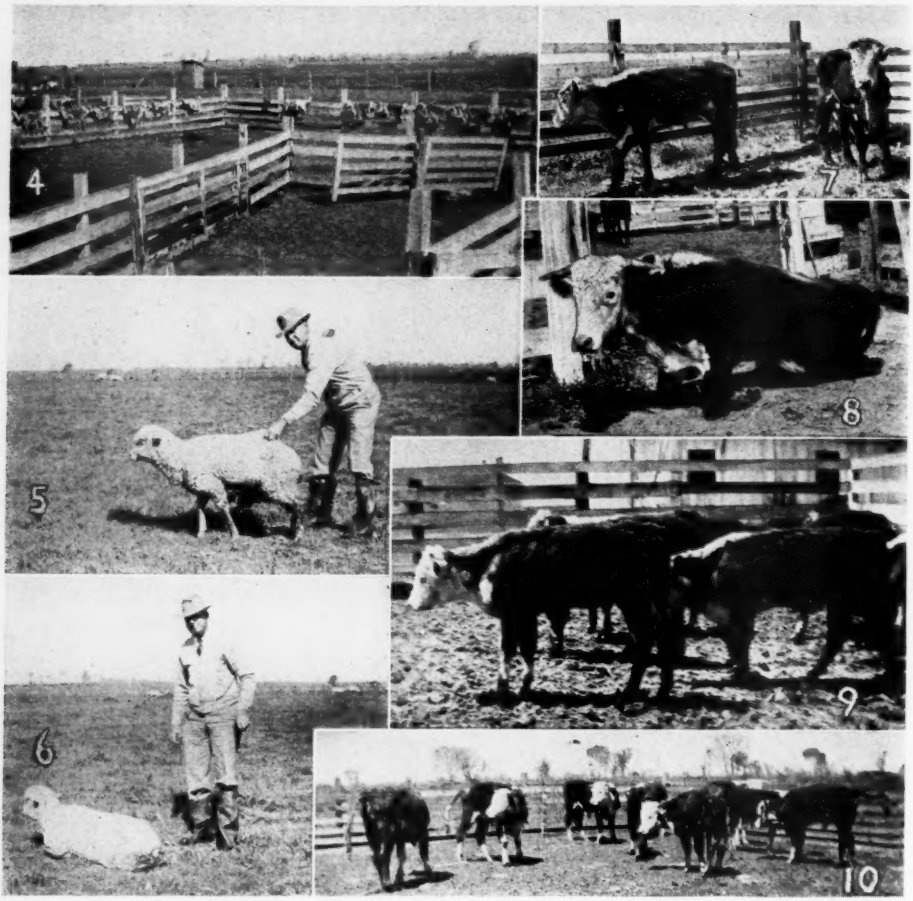


Fig. 3. Cross section of shaft of femur. Top row from cattle. Note bone on left, from normal six-month-old calf; on right, from three-year-old cow; center, from a bull on Ranch B. Note total absence of bone building matrix. Lower row from lambs of comparable ages. Left, normal; right, from Ranch A, both from shaft of femurs.



Ranch C

Ranch C has been in ladino clover for at least four years and has been used only for raising purebred Hereford cattle. During the winter of 1934, severe scouring developed among the yearling bulls on this place. As fast as the disease developed, the animals were removed from the ladino and placed in dry feed lots. When this investigation was started, twelve of the animals were alive; eight had died. They showed severe diarrhea, weakness, and emaciation. See Figs. 7, 8, 9, and 10.

As in the case of Ranch B, many treatments had been tried, but a definite schedule of treatment had not been followed and no benefit from the treatment had been obtained.

Fecal samples were taken from two of the bad cases and examined for worm eggs. Many roundworm eggs were found by the flotation method. Three autopsies were made, and from scrapings of the four stomachs and upper portions of the small intestines a heavy infestation of *Trichostrongylus* was demonstrated. The small intestines also contained thousands of *Cooperi oncophora.* Some *Ostertagia* also were found.

The walls of the bones of these animals were thinner than normal, the epiphyses soft, and the bone building matrix practi-

cally absent. Some of the animals also showed spontaneously fractured ribs with false joints. All of the bones of the skeletal structure were lighter than normal. See Fig. 11.

Treatment with one per cent copper sulphate solution in one-fifth gallon doses was instituted but without apparent effect. The animals continued to scour and deaths did not cease. Autopsies showed this agent had a very low efficiency on the *Trichostrongylus* and *Cooperia,* but a decided efficiency against the *Ostertagia.* Treatment was then changed to 20cc of tetrachlorethylene every five days. The scours stopped after the second treatment, the appetite returned, and the animals showed a decided improvement. When this latter treatment was instituted, only five animals were alive. Later one animal was killed and examination of the fourth stomach and intestines showed many *Trichostrongylus* still present but no *Ostertagi* or *Cooperia.*

Discussion

The first problem that presented itself when undertaking this investigation was whether or not the losses on these three ranches were due to the same cause. Such appeared to be the case for several reasons. The predominating symptoms in each instance were weakness, emaciation, and severe diarrhea associated with heavy nematode infestation and losses occurring only in animals pastured on ladino clover.

We were then confronted by the question —why were the severe bone changes found on Ranch A, not found on Ranch B and found only to a limited extent on Ranch C? The explanation may lie in the fact that the young lambs on Ranch A were the second generation on ladino clover and had originated from ewes that had been heavily parasitized and had spent most of their lives fighting a heavy parasitic invasion; while the ewes on Ranch B were fully developed and had time to accumulate the necessary bone building material. However, we believe that the lambs from these ewes would have shown the same bone picture if proper remedial agents against parasites had not been applied. The cattle on Ranch C did show evidence of light bones and here again they were the second generation on ladino clover.

Early in the investigation a deficiency of calcium and phosphorus in ladino clover was suspected. However, clover gathered from each ranch and analyzed at the University of California showed the following:

Ranch	*Calcium*	*Phosphorus*
A	.93%	.538%
B	1.38%	.475%
C	1.00%	.337%

The percentages show a normal proportion of these minerals. In every 100 pounds of feed on each ranch calcium and phosphorus were available in the following amounts:

Ranch	*Calcium*	*Phosphorus*
A	.93 lbs.	.538 lbs.
B	1.38 lbs.	.475 lbs.
C	1. lbs.	.337 lbs.

The reason A and B were higher in phosphorus was because this land had been superphosphated.

Chemical analysis of the bones from Ranch A showed the calcium and phosphorus ratio was normal but they were present only in 33⅓% of normal amount for a sheep of similar age. The specific gravity was one-third that of normal bones.

Clovers are known for their relatively high protein content, but in addition to this on Ranch B the ewes were receiving a cottonseed meal supplement and on Ranch C the sick animals were being fed on chopped alfalfa hay and rolled barley.

The animals in all instances were receiving a very satisfactory ration containing sufficient protein and sufficient minerals in the most utilizable form. The conclusion must then be drawn that there was a factor which prevented the assimilation of both the protein and bone building elements.

NATURALLY the question was raised could this factor be a plant. Plants of the species *Oxalis* were suggested and a search for these was made but none found.

About this time the animals started show-

Dr. and Mrs. J. S. Koen, Chicago, at the A. V. M. A. meeting, Oklahoma City, August 27-30, 1935. See page 416.

ing decided improvement following the treatment for the nematode parasites. The diarrhea practically stopped, the appetite returned, and deaths ceased. This indicated that the parasites were the primary cause of this trouble.

We were able to find in the literature only one reference to a condition of a similar nature.

Following are extracts from three articles published in the Report of the Director, University of Cambridge, Institute of Animal Pathology—3rd Report — 1932-33, by Dr. James Stewart and co-workers:

The authors would submit, however, that the results of the present series of experiments justify the conclusion that heavy nematode infestations interfere with the calcium metabolism and prevent the animals making full use of the calcium offered to them.

The bones throughout the body appeared to be distinctly lighter and more fragile than normal and in extreme cases their specific gravity was much reduced. They did not appear to be softer than normal and showed no signs of distortion.

The results of the present series of experiments show that the component of the ration most affected by large nematode infestations, was the crude protein.

This change from an abnormal metabolism of the protein to a normal metabolism being coincident in each case with a big fall in nematode infestation is significant. Moreover, the digestibility of the crude protein which was increased as the worm count fell, showed a sudden decrease coincident with the sharp rise in worm-egg count, due to the reinfestation of the animals.

The results obtained show that extracts of nematodes isolated from sheep inhibit the action of pepsin in the breakdown of protein can be called an antienzyme-enzyme.

Lambs low in calcium and phosphorus at beginning of experiment . . . . . that they increased their retention to a high value as the worm egg-count fell rapidly at the beginning of the experiment, cannot be disregarded.

It may, therefore, be concluded that nematode infestation besides inhibiting the absorption of protein, also interferes with the calcium and phosphorus metabolism of the host and thus both skeletal and tissue growths are retarded.

IN OUR investigation the question arose —why were these conditions observed only in ladino pastures? As has been mentioned, this condition developed only on ladino that had been planted for several years. In order to successfully grow ladino it must be irrigated every seven to ten days during the dry season. This provides an excellent environment for the propagation of worm eggs because of the moisture and temperature.

It took time to build up the infestation in these pastures. A procedure should, therefore, be followed of placing only animals free from nematodes on this class of feed. This probably means that all ruminants and horses should be treated for worms prior to grazing ladino.

University of Illinois exhibit at the A. V. M. A. Clinic, Oklahoma City. See page 420.

The Microscopic Examination of Producer Samples of Milk for Streptococci of Mastitis*

By CLAUDE S. BRYAN and FLORENCE T. HUBER**
Michigan Agricultural Experiment Station, East Lansing, Michigan.

THE milk produced by cows infected with streptococci of mastitis is decreased in amount[6] and inferior in quality, as determined by the usual bacteriological tests.[4] A dairy concern will, therefore, give each producer an invaluable service by the use of an accurate test to determine the presence or absence of streptococci of mastitis in the producers' milk and also improve its own commercial product. The routine application of such a test will be of most value, for then all cows in each herd will be under test, including those that freshen from time to time. At present no data are available to indicate the sensitivity of such an examination when applied to herd milk. This matter was studied along with certain factors to increase the efficiency of the test.

The presence or absence of the streptococci may be determined either by isolation of the organisms, or by the microscopic examination of Breed's smears prepared from the milk or cream. The milk taken from the producers' cans has been subjected to outside bacterial contamination, depending upon the methods of production employed. These contaminating bacteria tend to outgrow the streptococci on culture and therefore make the results less accurate. Too many contaminating bacteria may obscure the streptococci, if present, on microscopic examination. During incubation curds are formed in many of these samples which decrease the efficiency of the examination by making it impossible to make good smears for microscopic examination.

Various dyes have been added to the milk to prevent the growth of these contaminating bacteria prior to examination[1], but the streptococci were also kept from reproducing. Similarly another dilution of these dyes was found to permit easier isolation of the streptococci on culture by inhibiting the contaminants and permitting the streptococci to reproduce[2]. Grosbeck[5] has demonstrated the value of these dyes in the routine examination of milk samples for streptococci.

The fact that one dilution of dye inhibited the development of the streptococci and another dilution permitted their growth in a solid medium, suggested the possibility that a dilution of dye could be found that would permit the growth of the streptococci in the milk upon incubation, but inhibit the growth of the contaminants and consequent curd formation. In short a microscopic examination of an incubated sample of producers' milk would permit accurate detection of the streptococci.

Method.—Producer samples were collected by sampling the various cans upon arrival at the receiving station. A small metal dipper was used to stir the milk in each can and collect the sample. The dipper was placed in boiling water between samplings. These samples were cooled immediately and held cool until their arrival at the laboratory.

Immediate microscopic examination of

*Sections of Bacteriology and Animal Pathology.
**Journal Article No. 230 (n.s.) from the Michigan Agricultural Experiment Station.

films made from these milk samples indicated that only a few contained visible streptococci, but upon incubation many more were found to contain streptococci. Thus the necessity of an incubation period was established.

Some of the producing herds were visited and individual cow samples collected. The procedure followed consisted in wiping the udder of each cow with a moist cloth, discarding a stream from each quarter, and then milking directly from each quarter into a sterile tube. The diagnosis of infection was based upon the presence of streptococci or streptococci plus leucocytes in the milk, according to the method described by Bryan[3].

Results and Discussion.—Preliminary studies were carried out using varying dye dilutions in the milk and varying periods of incubation. Brilliant green in final dilutions of 1-25,000, -30,000, -40,000, -50,000, -75,000, -100,000, -150,000, -200,000, and -250,000 was added to 10cc aliquots of several producers' milk. These, together with a control series (no dye), were incubated for 10, 11, 12, 13, 14 and 15 hours at 37°C. before preparing the slides for microscopic examination. Curds were present in practically all of the dilutions from 1-75,000 to 1-250,000 inclusive, and in the control within 10 to 12 hours of incubation. Curds developed in additional samples on prolonged incubation. Since the microscopic method for diagnosis of streptococcic mastitis already referred to is based on a 12-hour incubation period it was decided to employ the same time period in this instance.

The 1-25,000 and 1-30,000 dilutions of brilliant green did not permit adequate reproduction of the streptococci and thus many of the infected samples were missed. The 1-40,000 and 1-50,000 dilutions were ideal for the 12 hour incubation period. The 1-50,000 dilution of brilliant green in milk was chosen, for if accurate measurements of the dye and milk are not made, a slight margin of safety is presented which would not be the case if the 1-40,000 dilution was used. Apparently the 1-40,000 dilution is near the critical point where the dye begins to inhibit some of the streptococci. Subsequent producer samples were run, using 1-50,000 final dilution of brilliant green along with a control series (no dye), incubated for 12 hours at 37°C., after which time all samples were examined microscopically for the presence of streptococci.

Table I presents the data obtained in a study of 732 producer samples of milk. The data are grouped according to the total number of samples that showed streptococci in both the 1-50,000 brilliant green and the control series (510), and the total number in which streptococci were not seen in both series (141).

Thus 651 or 88.9 per cent of the 732 samples agreed in the presence or absence of streptococci in both series. Thirty-one of the remainder or 4.2 per cent were positive (streptococci seen) in the control series and negative (no streptococci seen) in the brilliant green preparations. It seems evident that the brilliant green preparations were not sufficiently looked over and thus the streptococci were not seen, in these instances, when present in small numbers. The fifty remaining producers' samples, or 6.9 per cent, were negative in the controls and positive in the brilliant green series. Many rod forms of bacteria present in the 50 samples of the control series were inhibited by the dye in the brilliant green series. Apparently the contaminants in these particular samples exerted an inhibitory or crowding out action on the streptococci.

The curd formed in some of the samples during incubation interfered with making good preparations for microscopic examination. On this account no streptococci could be found in many of these samples. The value of brilliant green in preventing curd formation is indicated by the data in Table I. In 31 cases or 15.3 per cent of the samples forming curds, curds were formed in both the brilliant green and control series, and in only 12 cases, or 6 per cent, were curds formed in the brilliant green and not in control, compared to 159, or 78.7 per cent, in which curds formed in the control and not in the brilliant green series. Although curd formation was not completely inhibited

Table I—Comparative study of 1-50,000 brilliant green in milk and control in detecting the presence of streptococci of mastitis and inhibiting the curd formation in incubated producers' samples of milk. The samples are tabulated according to the number of producers' samples per dairy.

	STREPTOCOCCI*					CURDS**			
Number of producers per dairy	Total Samples	+ agree in both	− agree in both	+ control −1-50,000 B. G.	− control +1-50,000 B. G.	Total Curd	+ agree in both	+ control −1-50,000 B. G.	− control +1-50,000 B. G.
21 to 61.....	87	49	23	6	9	24	5	18	1
61 to 121.....	236	152	55	10	19	35	4	30	1
121 to 141....	409	309	63	15	22	143	22	111	10
Total.....	732	510	141	31	50	202	31	159	12

*Streptococci seen (+), no streptococci seen (−).
**Curds formed (+), no curds (−).

Table II—The extent of infection and pounds of milk produced daily in 18 of those herds that had streptococci in the producers' samples.

Producer	Pounds of milk sold daily*	Total Number of Cows			
		Herd	Infected	Suspicious	Negative
518.....	424	13	2	0	11
163.....	170	8	1	2	5
561.....	128	8	4	1	3
M20.....	263	7	2	0	5
M9.....	223	12	9	2	1
H. B.....	275	17	9	0	8
602.....	37	4	1	0	3
456.....	167	10	1	0	9
157.....	380	43	3	0	40
208.....	166	9	1	0	8
461.....	280	14	1	0	13
674.....	201	10	1	1	8
203.....	472	18	1	0	17
168.....	326	30	5	0	25
M36.....	412	11	3	3	5
M5.....	190	10	5	1	4
206.....	400	20	4	2	14

*These figures represent the pounds of milk sold daily; in addition several pounds, used daily on each farm, were produced.

by the dilution of dye that still permitted the growth of streptococci, the desirability of using 1-50,000 dilution of brilliant green was demonstrated.

These results give some idea as to whether streptococcus infection is present or absent in the herd samples. However, it is of interest to know the extent of streptococcic mastitis present when the producer sample is positive. It is also of value to know how many cows in a herd need be infected before the composite producer sample will be positive. A large number of herds were tested. The data presented in Table II were obtained in 18 such herds showing streptococci in the producer samples. In some herds only one out of every 18 cows were infected while in others as high as 50 per cent were infected, with all ratios in between. In all cases streptococci were found in the producer sample when any of the cows were infected with streptococci of mastitis. The dilution of the streptococci varies in the milk from the different herds and depends on the production of the cows, extent of infection, number of cows producing milk, etc.

In like manner it is necessary to know

the condition in the herds where no streptococci were found in the producers' samples. Individual cow samples of milk were collected in 18 herds where no streptococci were found in the producers' samples. These herds were of the same size as those to which reference was made in Table II. In no case were streptococcus-infected cows found in the herds where streptococci were not found in the producer sample.

Summary

Brilliant green in final dilution of 1-50,000 dye in milk was found to inhibit extraneous bacteria and curd formation in all but 6 per cent of the producer samples and still permit reproduction and subsequent detection of the streptococci upon incubation of 12 hours at 37°C.

In case streptococci were found in the producer sample, cows infected with and eliminating the streptococci were found in the herd. Such producer samples contained streptococci when as few as one out of 18 cows were infected. No herds were encountered in which the ratio of infected to non-infected was greater than one to 18.

In case no streptococci were found in the producer sample the cows in the herd were found free of streptococcic mastitis.

Routine application of the test gives most information, for then all cattle will be under test including those that freshen from time to time.

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Bill and I Contract Rabies—Almost

It has been said that experience is the best teacher. I agree. Agassiz once said that people should study nature, not books. I learned more about rabies last summer by experience than I have by reading books on that specific topic.

It is well known in Hadleyburg, where I live, that I am a veterinary student. One of my friends, Bill Smith, came in to my mother's store, where I was employed during the summer months, and asked me to come up to the hotel to examine a dog which he thought had rabies. I went with Bill.

At the hotel one of the bellhops took us to the room where the dog was. I opened the door and saw Mrs. Jones with her sons, John and Jim, and a Boston terrier lying on a small cushion, i. e. the terrier was lying on the small cushion. Mrs. Jones and the children were in tears, the terrier was in convulsions. A veterinarian called from a neighboring village had given the dog sedatives and dispensed some pills to quiet the nerves; but had pronounced the case as probably rabies. I was told the dog had been playing with lead shot, and with other dogs at the hotel.

After pondering upon the history of the case and the symptoms, I made a diagnosis of acute lead poisoning, and prescribed Epsom salts followed by bismuth subnitrate.

That night Mrs. Jones asked me to telephone another veterinarian. I called one who lives thirty miles away and described the history and symptoms. He immediately pronounced the case rabies, and stated that all who had been bitten by the dog or had handled the dog in any way were apt to develop rabies, and should take the Pasteur treatment. Mrs. Jones was frantic. I saw a scratch on my right thumb and held a lighted match to the area. Bill noticed that he had an abrasion on the palm of his left hand, and was much upset.

The next morning the dog died and it was shipped to the State Health Department in Albany. Four days later, a special delivery letter from the health department informed

me that no negri bodies were found on microscopic examination, but that it was advisable for me and all others who had touched the dog to take the Pasteur treatment anyhow.

Our drug stores ask $18.00 for the Pasteur treatment. I didn't have 18 dollars; neither did Bill. The situation was tense—dramatic. Many people, including one of the bellhops had touched the dog. The bellhop would transmit the infection with his hands to food, baggage and everything that he touched around the hotel and so expose the 300 guests of the hotel. If the situation were told panic would ensue. To prevent all this trouble we kept is secret.

Four months have elapsed—there have been no rabies casualties. I learned (1) that a veterinarian's diagnosis over a telephone is of questionable accuracy; (2) to examine my hands before handling a dog that exhibits nervous symptoms; (3) a veterinarian must make his own diagnoses in suspected cases of rabies from the history and symptoms. Health departments won't help him much. If they find Negri bodies they advise Pasteur treatment for those exposed; if their findings are negative they advise Pasteur treatments anyhow and the practitioner is right back where he started.

Samuel E. Herman,
South Fallsburg, N. Y.

* * * *

Typhlectomy in the Dog

Typhlectomy may be defined as the surgical removal of the cecum. One indication for this operation is a heavy whipworm infestation.

Although it is the opinion of many practitioners that the presence of this parasite, (*Trichuris vulpis*) is of no significance, my observations have convinced me otherwise.

A dog that is infested with whipworms may show a dermatitis, either dry or moist eczema, which usually clears up when the cecum is removed. Auricular catarrh, conjunctivitis and sometimes convulsions also may be attributed to the presence of whipworm, since cases have improved following typhlectomy.

Trichuriasis lowers an animal's resistance and makes it more vulnerable to infections. It is advisable that dogs be freed of these parasites.

Treatment. — Carbon tetrachloride and tetrachlorethylene are considered at present the best drugs to expel this parasite; but the results of their use are not entirely satisfactory, probably owing to the location of the parasite and the anatomical structure of the cecum in the dog. Some small animal practitioners have tried rectal injections, but only one, Steinach of New Jersey, has reported entirely satisfactory results and in his hands the treatment in some cases was prolonged for weeks.

Surgical procedure is an effective treatment, because by removing the principal habitat of the whipworm any parasites remaining in the intestine and reinfestations are amenable to parasiticide treatment.

A MALE three-year-old fox terrier and weighing 15 pounds was presented for treatment. The mucous membranes were anemic; the coat exceedingly rough, and the patient depressed. A fecal examination was positive for *Toxicara canis* or round worms and *Trichuris vulpis* or whipworms.

The dog was then given 15cc of calcium gluconate (20%) solution subcutaneously. This was given to assure a high calcium content of the blood and prevent tetrachlorethylene poisoning. Tetrachlorethylene—1½cc — was given but the patient showed little improvement. Another fecal smear was made and proved negative for round worms, but still revealed many whipworm eggs.

The cecum was removed and the patient gradually came back to normal; the anemia entirely disappearing. The hair coat improved rapidly and the animal's interest in life was again restored.

THE cecum in the average dog is about 3 to 6 inches in length, and flexuous. The flexures are maintained by the peritoneum, which attaches it also to the ileum. It is situated usually about midway between the right flank and the median plane ventral to the duodenum and the right branch of the pancreas. Its anterior end opens into the

origin of the colon, lateral to the ileo-colic orifice. The other end is pointed and blind.

THE animal should be starved for 24 hours prior to the operation, placed in dorsal recumbency on the operating table and ether used as a general anesthetic.

The field of operation, preferably from the umbilical scar backward, 2 to 3 inches according to the size of the patient. This operative site is cleanly shaved; ether used to remove the fats and painted with tincture of iodine. The hands are prepared by thorough washing and dipping into a solution of nacent iodine.

Make sure the bladder is empty to prevent its incision. Then apply a sterile operating cloth over the operative area.

In large dogs, collies, German shepards, etc., the incision should start 1½ inches posterior to umbilical scar and extend backward about an inch. In smaller dogs, Bostons, fox terriers, etc., start the incision ¾-inch posterior to umbilical scar.

Make the incision on the median line, thus preventing hemorrhage as much as possible; incise the skin. Then discard the knife and use another. Next incise through the musculature. In cutting through peritoneum use the blunt end of grooved director to avoid incising the intestines.

Withdraw intestines through the incision with an ovarectomy hook. There is only one means of picking up the cecum and that is to pull out the intestine until it comes into view. To prevent its chilling, as little intestine as possible should be exposed at a time; as a new portion is withdrawn that previously pulled out should be returned.

When the cecum is located it should be carefully dissected away from the intestine. The cecum should then be removed. One should not cut off too much of the cecum or it will be very difficult to put in a purse string suture.

After organ is removed swab the stump first with phenol and then neutralize with alcohol. In the end of the stump one places a purse string suture using chromic cat gut No. 00. One should be sure that the mucous membrane is turned in and then tighten the suture.

Instead of removing the cecum some practitioners find that by inversion of this organ, and using a purse string suture, it may be prevented from returning to its normal position.

To close the incision in the abdominal wall, suture the muscle and peritoneum together with interrupted sutures of chromic cat gut No. 00. Close the skin with interrupted sutures of braided silk No. 12.

Apply a pack of iodoform and boric acid 1:10. Then bandage.

The stitches should be removed in five days, and the wound should be painted with tincture of iodine. The case will usually respond very nicely and no other after care is ordinarily necessary.

L. L. Picot III,

Caldwell, N. J.

Loss of Pigs From Undetermined Cause

During the spring months, a fatal malady occurred in three to four-week-old pigs in some sections of Massachusetts. The condition occurred regardless of whether the sows were fed garbage or grain. The pigs were in good condition. In one herd of 238 pigs farrowed, 121 died.

The malady had a sudden onset. One or more pigs in a litter would begin to vomit or scour and within two or three days all of the litter died. The sows that lose their pigs cease the production of milk and dry up almost immediately, but there has been no evidence of disease in the sows. The sows are all cholera immune.—R. H. S.

Reply: From your description the litter is apparently the unit of the disease. You gave no lesions upon which to base judgment. The sudden cessation of milk flow in so many sows even though they lost their pigs is unusual.

The history and symptoms indicate a dietary disorder. The feeds produced in the drouth area in 1934 were more or less deficient in different required elements. We believe that if the sows are fed a barley mash, providing the barley is of good quality, it will prevent future trouble of this character.—A. T. K.

Notes on Epidural Anesthesia

Previous to the demonstration given in this country, in 1926, by Benesch of Vienna, epidural anesthesia was practically unknown to the veterinarians of America. Although some were skeptical, many hailed this type of anesthesia enthusiastically. Epidural or caudal anesthesia, as it is called, is now widely and successfully used, having gained much favor and a permanent place in the last decade, in the routine anesthesia used by practitioners.

Benesch originally recommended epidural anesthesia for dystocias and troubles of similar nature in cows. Recent investigations have added advantages, and it has been used successfully in metritis, prolapse of the uterus, rectum, vagina and cervix, removal of retained placenta, suturing in the perineal region, operation on the udder, hind legs and feet, and certain abdominal and pelvic operations. Dykstra, Frank, and McLeod write: "It may be used in any painful operation posterior to the last rib, or in any situation in which motor resistance is to be overcome. Operations upon the genitalia (obstetrical or otherwise), on the rectum, teat, urinary bladder, etc., come in the above grouping." The use of this anesthesia has been extended also to the horse, dog and hog.

The limitations too should be pointed out if one is to formulate an opinion as to the value of this anesthesia. In the horse the anesthesia is not effective for as long a period as is the case in cattle. It is necessary to repeat doses about every half hour in the horse to obtain a continued effect.

There is a possibility of overdosing, which may result in prostration. The chance of this occurrence is small, however, if the recommended dosage is followed. There seems to be no cases of hypersusceptibility. In "going down" there is, of course, the possibility of fractures and dislocations, but no after effects due directly to the anesthetic have been observed following large or repeated doses.

Some have feared pricking and resultant dysfunction of the nerves in the spinal canal would result when the needle was inserted. A demonstration by Hopkins clearly demonstrated that this fear was due to a misconception of the anatomy and innervation of the parts and that there is no reason to fear such injury.

Dr. Johannes Richter, University of Leipzig, in his report on experiences with epidural anesthesia states that it is contraindicated in sterility work; producing a relaxation and flabbiness of the rectum that makes sterility examinations more difficult.

The technique is agreed upon, but there is some difference of opinion in the choice of the anesthetic. All kinds, however, seem to work well. Richter used 0.1 grain of chemocaine in 5 to 10cc of fluid in a cow of medium size. Cocaine, procaine, tutocaine, quinine, urea hydrochloride, and others have been used in one to two per cent solutions with apparent success.

Intraspinal injection in the horse and cow are made on the median dorsal line of the vertebral column. In the horse the injection is usually between the first and second coccygeal vertebrae, while the sacro-coccygeal space is the usual site in the cow. Ankylosis or other abnormalities of articulation in some individuals may alter the situation, and in these cases the injection is made where the sharpest bend occurs when the tail is lifted forcibly. A two-inch, 16-gauge needle is used for horses, and is inserted downward and forward at an angle of about 45 degrees exactly in the mid-line. The dose is 30cc of a 1 per cent tutocaine solution, repeated as necessary. The usual dose for a cow is about 20cc of a 1 per cent tutocaine solution. Doses of 40cc produce complete paralysis of the hind parts. No disastrous effects have followed overdosing or frequently repeated doses. In the cow a 1¼-inch, 16-gauge needle seems to work best and should be directed more vertically than in the horse.

Dykstra says: "In the dog, the dura mater terminate at least one-half inch anterior to the lumo-sacral space, so that this is the preferred site of injection. A depression in the middle of the spinal region may be located accurately by drawing an imaginary

line across the posterior borders of the wings of the ilium.

This line passes almost exactly over the depression. A 20-gauge needle with a two or three-inch shank is inserted in the depression in a vertical direction, then tilted slightly backward and continued downward until it has entered the spinal canal. In small dogs it need be passed only a half inch and up to two inches in larger dogs. 5cc of a 2 per cent solution of procaine for a terrier, 12cc for a 50-pound dog and 20cc for a dog weighing 100 pounds is recommended. After the injection, the animal should be held in dorsal recumbency for a few minutes, that the anesthetic solution may flow forward and thus prepare the animal for operations anterior to the tail. For operations on the tail, the animal should be permitted to sit on his haunches.

"In cats the same instruments and technique are used as in the dog. Usually 3cc of a 2 per cent solution is sufficient to render the posterior portion of the cat insensitive.

"In swine the injection is made in the lumbo-sacral space. In 200-pound hogs, or heavier ones, this space is almost completely closed, making them poor subjects. The lumbo-sacral space is located by drawing an imaginary line across the anterior borders of the wings of the ilium. The site of the injection is at a point two and one-half inches posterior to this line and exactly on the median line. An 18-gauge needle with a three-inch shank is preferred and is inserted in a downward and forward direction. 5cc of a 1 per cent solution is usually sufficient for a 40-pound hog, though larger animals may require from 15 to 20cc."

The results of the use of epidural anesthesia in swine, cats and dogs is encouraging. The restraint needed for injecting the anesthetic varies widely in different animals. In most of them practically no restraint is required. Others require restraint as for other minor operations. This form of anesthesia has certainly made obstetrical performances and operations easier, quicker and safer.

Arthur F. North, Jr.,
Somerville, N. J.

Cook Pork Well

The familiar caution, "Cook Pork Well," is now in pictorial form. The illustration seeks to protect the public more fully from the danger of trichinosis. Trichinae are sometimes present in raw or imperfectly cooked pork and its products. Prepared by the Bureau of Animal Industry, the illustration supplements Leaflet 34, "Trichinosis," and frequent press and radio statements.

Although only 1 or 2 per cent of hogs in the United States are affected with trichinae, there is danger—especially in the case of products prepared from farm-killed hogs—if the meat is eaten without first being thoroughly cooked. When a pork product is the composite result of meat from many hogs, as in packing-house products, there is less likelihood of clinical trichinosis.

The new illustration reminds the customer to "Cook Pork Well." It also says, "Pork Is a Savory, Nourishing Food," and "Pork Is Rich in Protein, Fat and Vitamin B." The illustration is intended for use in a variety of ways. It may be reproduced on wrappers used for pork products; wrapped in as an insert; or enlarged for display as a poster in meat shops. It may be used also in trade journals, consumers' magazines, etc.

The outcome of damage suits over cases of trichinosis, traced to purchases from certain meat shops, has often hinged on the question of suitable warning. The new illustration provides such a warning. The Federal Meat Inspection Service requires safeguards against trichinosis in the preparation of all pork products that are customarily eaten without further cooking. To be safe, products prepared on farms and in uninspected establishments require procedures similar to those enforced under Federal meat inspection. Adequate cooking of pork will always kill any trichinae; hence the caution, "cook pork thoroughly," applies to all raw pork proudcts, whether inspected or not, and is a blanket recommendation.

Copies of the illustration, about 4 by 6 inches, in black and white, may be obtained from the Bureau of Animal Industry, U. S. Department of Agriculture, Washington,

D. C. Persons who desire to reproduce it in colors may do so. Thus far the illustration is available only in English, but plans have been made to issue it also in German and Italian.

Practical Suggestions

A package of 100 paper towels, flat type, saves many a wait with cold, wet arms, while the farmer is waiting for his wife to decide which towel she will let him take to the barn.

Dog food cans, with the tops removed neatly and smoothly, after a thorough washing are handy for dispensing large compressed tablets, salves and powders in small quantities. Carry a few in your car.

When it is desirous to prevent a cow from standing in the gutter, particularly when there is danger of an eversion of the uterus, an old ten-gallon milk can, which is nearly always available, placed in the gutter lengthways behind the cow, will keep her out.

J. V. Hills.

Gowanda, N. Y.

INDIANA MARE FOALS QUADRUPLETS

No doubt the triplet foals reported from Kansas is, as Dr. L. R. Wempe reports (page 404, September, 1935, VETERINARY MEDICINE) a rare occurrence; but in this state, we sometimes go the Kansas mare one better.

In January, 1915, I was called to see a grade mare, ten years old, weighing about 1400 pounds, with the information that she had lost twin foals and needed attention. When I arrived, the two foals were in evidence, about the size of full-grown cats. Upon examination, I discovered two more foals in the uterus, about the same size, and delivered them. Of the four, two were horse coalts and two fillies, all dead, of course. The mare recovered.

L. A. Ray,

Cloverdale, Indiana.

VITAMIN B_2 PRODUCED SYNTHETICALLY

One of the most important items of scientific interest at the American Medical Association Convention at Atlantic City in June was a little amber glass vial, displayed in a specially built glass cabinet and illuminated with a special amber light to protect the contents from destruction by the actinic rays of ordinary light. In this vial were four grams of the first vitamin B_2 ever prepared synthetically and preciously valued at $10,000—as a matter of fact, the total amount of synthetic vitamin B_2 in the United States. This was a feature of the scientific exhibit of Hoffmann-La Roche, Inc., of Nutley, N. J. The significance of production of vitamin B_2 synthetically is grasped when it is considered that 36,000 quarts of whey, the usual source of natural vitamin B_2 for scientific workers, would be required to yield an amount of the natural vitamin equivalent to the four grams of synthetic vitamin B_2 exhibited. Those four grams represent 1,333,333 biological units of Vitamin B_2.

WYOMING IS 25TH STATE TO ERADICATE BOVINE TB

Completion of the testing of cattle for bovine tuberculosis in Wyoming on August 21, placed Wyoming in the modified accredited area. This designation by the U. S. Department of Agriculture indicates that bovine tuberculosis has been reduced to 0.5 per cent or less of the cattle in the area. Wyoming is the eighth western state to attain such official recognition and the third state since August 1. Most of the testing in the state was of range cattle.

As Wyoming is the twenty-fifth state to become "modified accredited," the achievement signifies progress beyond the half-way mark in the effort to eradicate the disease from all states. Subsequent progress will be rapid, because of the greater facilities for carrying on the work as a result of Federal emergency funds and also because most of the heavily infected dairy centers have been cleaned up. There are now only a few areas where the percentage of bovine tuberculosis is high.

Common Parasites of the Cat

By CHARLES D. STAFFORD,
Oakley, Calif.

IN RECENT years the number of cats brought to veterinarians for treatment has increased steadily. As with dogs, the importance of parasitism in cats has been under estimated. The more important parasites of this animal include: fleas, lice, mange mites, round worms, hook worms, strongyles and grubs.

Flea Infestation

Two species of fleas most commonly affect cats, *Ctenocephalides felis* (cat flea), and *Ctenocephalides canis* (dog flea). Formerly these were classed as one species, *Pulex serraticeps,* but a later classification recognizes a specific difference based principally upon the form of the head. Occasionally the human flea, *Pulex irritans,* will be found infesting cats. Usually all species of fleas have some one host on which they prefer to live, but they will often live and thrive upon other animals.

Fleas are a continual source of irritation to their hosts, causing much scratching. Heavy infestations, may cause a debilitation and emaciation due to loss of blood and annoyance. It is also known that the flea is the intermediate host of *Dipylidium canimum,* the dog tapeworm, which may infest also cats and humans. Fleas transmit the human plague bacillus, but they are not known to be vectors of important animal diseases.

The common way of treating cats for fleas is the use of various powders. Persian insect powder (pyrethrum), dalmatian powder (*chrysanthemum cinerariaefolium*), sodium fluoride one per cent, and derris root powder are the most efficient. These powders do not kill the flea, only stupify it, allowing it to drop off or to be combed from the hairs. It is advisable to place the animal while undergoing treatment, upon a large sheet of paper which may later be rolled up and burned with the collected fleas. In applying the powder, it may be applied liberally and driven well under the hair. In the case of pyrethrum, it is well to moisten the skin slightly.

A seven and one-half per cent solution of Volk's may be used to bathe the cat, but the use of coal tar or phenol derivatives in baths is strictly contra-indicated.

None of the above methods of treatment is entirely satisfactory.

Pediculosis

The only louse affecting cats is the *Felicola subrostratus,* a biting louse. Lousiness in cats is usually the accompaniment of a debilitated condition in young animals.

The most effective treatment is the same as for fleas. This should be repeated once a week for three weeks to insur the destruction of newly hatched lice, as the louse lays its eggs on the hair. The eggs hatch in from five to six days.

Auricular Mange

The mange mite, *Otodectes cyanotis,* perhaps affects 75 per cent of all cats, especially the long-haired varieties, and is without doubt the major cause of spasmodic fits in cats.

There is frequent shaking of the head and symptoms of intense pruritus with scratching which may lead to a dermatitis, loss of hair, and bleeding surrounding the affected parts. In warm surroundings, the conditions are aggravated. In the auditory canal there is a deposition of black colored, fetid wax with other *debris* which is very adherent. If the condition is of long standing there is a severe otorrhea and perhaps ulceration of the auditory canal. It should be remembered that any kind of black wax or dirt in the ear is indicative of ear mange in cats.

Cotton swabs should be used to clean the ear and canal, in mild cases; after cleaning, olive oil applied to the ear is satisfactory. In cases where there is a great amount of

wax, hydrogen peroxide may be used to loosen the accumulation before cleaning, followed by application of the oil. Another preparation that may be used after cleaning is equal parts of carbon tetrachloride and olive oil. In cases where there is considerable suppuration, the cleaning of the ear with swabs immersed in ether and followed with the application of boric acid to the parts has proved successful.

Sarcoptic Mange

Sarcoptic mange in cats is caused by the *Notoedres cati* (Sarcoptes minor var. cati) and is usually called "head mange."

This begins about the ears and upper part of the neck and extends over the head gradually. As a rule it remains limited to these parts, but may spread to the entire body including paws and tail.

The first and most characteristic symptom is that of continual scratching, and shaking of the head. Small papules and vesicles form on the skin. This is soon followed by thick gray crusts and scabs, especially along the edges of the ears. At the same time the hair falls out, the skin becomes thickened and wrinkled, there is a characteristic odor. In severe cases, the constant irritation and worry to the animal causes it to lose its appetite and it may become emaciated. The cause and effect then become retroactive, as the mange will extend more rapidly on a debilitated animal, and the increase of mange increases debility.

In treatment, the affected areas should first be clipped. The most satisfactory agent to use is alkaline-sulphur ointment U. S. P., applied every other day. The following prescription is very useful: Alkaline-sulphur ointment 100 parts, balsam of Peru and green soap, 25 parts each. In small areas, balsam of Peru is most effective, but must be used with care as it causes severe cerebral disturbances, when absorbed, which may be followed by death.

Sponging the parts with carbon tetrachloride, being careful of the eyes and ears, has also brought good results.

In treating the affected parts, do not forget to treat the paws and tail to prevent the spread of the mange.

Demodectic Mange

Demodectic mange is of rare occurrence in cats. When it does occur, the disturbance is slight. The mange mite, *Demodex folliculorum var. cati,* burrows into the hair follicles and sebaceous glands. It is more common in the breeds with short hair, and manifests itself as either squamous or pustulant; its spread is very slow. The *D. folliculorum* is the human follicular mange mite. Mönnig does not list a variety affecting cats.

The favorite site of the demodex is about the eyes, nose, and ears, also other parts of the head, and it may be found on the paws. The lack of pruritus serves as a method of differentiation from sarcoptic mange.

In the squamous type, bald spots appear and the skin assumes a scurvy appearance; positive diagnosis can be made only by taking deep skin scrapings.

The pustulant form is shown by the formation of small pustules that discharge a dark red pus. The skin may be a reddish-copper color.

The treatment is usually of long duration, and the animal must be supported with excellent general care. Balsam of Peru, as used in sarcoptic mange, is of value. Chaulmoogra oil and ether has given good results. Small areas may be painted with pure formaldehyde. Fetal extracts used with local treatment is also suggested. In applying remedies, remove all scabs and treat the surrounding area. In the pustular form, express the pus from the lesion.

Taeniasis

The most common Cestodes that infest cats are *Taenia taeniaeformis, Dipylidium caninum, Echinococcus granulosus, Diphyllobothium latum* (unarmed) and *Taenia pisiformis.* The first mentioned is of the most clinical importance. The larvae of *T. taeniaeformis* is a cysticercus *(Cysticercus fasciolaris)* inhabiting the liver of rats and mice. The tape worms of dogs and cats are of great importance on account of the diseases caused by their intermediate stages in domestic animals and man.

When present in large numbers, they cause a chronic catarrh of the intestine, poor appetite, diarrhea with subsequent consti-

pation, salivation and in some cases there is a dimness of vision and deafness. Finally there is emaciation and manifestations of nervous disturbance, or there may be convulsions ending in death.

The tapeworm egg may be found on microscopic examination of the feces, or proglottids may be observed in the feces.

Before treatment, the animal should be starved 18 hours. Arecoline hydrobromide may be given up to one-eighth grain according to weight. After the worms have been expelled by peristaltic movement, a low enema should be given to remove those that have clumped together in the rectum.

Oleoresin of Aspidium (male fern) given in the dosage of three to eight grains, followed in one-half hour by phenolphthalein one-fifth to five grains, brings about the expulsion of tapeworms.

Ascariasis

The comon round worm of cats, *Toxocara mystax,* is usually found only in young cats. The round worm of dogs, *Toxascaris leonina* and *Toxocara canis,* are occasionally found. Their normal habitat is the intestine, but they may enter the stomach causing the animal to vomit.

The symptoms are much the same as those caused by tapeworms; irregular appetite, emaciation, diarrhea or constipation and epileptiform seizures. They may form in masses in the intestines and obstruction or invagination of the alimentary canal may occur. Positive diagnosis is made by finding the eggs on microscopic examination of the feces.

Santonin combined with calomel one-tenth to one-half grain, is recommended for the removal of the ascarids. This is an efficient anthelmintic.

Crystalline hexylresorcinol has been used recently as an ascaricide, but as to the result obtained in cats I have no knowledge.

Ancylostomiasis

In an experiment at the Kansas State College, veterinary division, 90 per cent of 200 cats autopsied were found infested with hookworms, *Ancylostoma caninum,* and of all the parasites infesting the digestive system of the cat this causes the most damage to the host. Another species, *A. braziliense,* infests the cat in tropical and sub-tropical countries. Still another species of hookworm, *Uncinaria stenocephala* infests the cat, but is less important in the United States than the *A. caninum.*

The most outstanding symptom is anemia accompanied by hydremia. The animal is depressed and debilitated and the hair becomes rough. The feces may contain blood. Positive diagnosis can be made only by finding the eggs in the feces on microscopic examination.

Tetrachlorethylene is claimed to be from 99 to 100 per cent effective against hookworms. For the cat the dose is according to the weight up to 0.5cc. The animal should be starved for eight to ten hours and fed again two to three hours after administration of the drug. As a routine measure of safety, a purgative should be given one to two hours after tetrachlorethylene, but avoid the use of oils. Phenolphthalein is perhaps the purgative of choice for cats. The drug is contra-indicated in any debilitating disease and especially in any gastro-intestinal inflammation.

Pulmonary Strongylosis

Verminous pneumonia of cats is produced by the ova and embryos of *Aelurostrongylus abstrusus* (*Strongylus pusillus*); this frequently occurs without symptoms by which it may be recognized. There may be a frequent cough accompanied by vomiting; when emaciation and diarrhea follow such symptoms, death will usually result in from two to three months. There is no successful treatment for this condition.

Grubs

One of the most interesting parasites and of which there is very little known is the "cat grub." This is the larvae stage of the rabbit bot fly, *Cuterebra cuniculi* and *Bogeria buccata.* Probably the larvae of the latter is the more commonly found. The mode of infestation is not known. It is believed that it occurs through the ingestion of field rodents that have been infested by the fly.

The larvae have been found in various stages of development. The young are white in color, while that of the adult is brown. Their average size has usually been approximately one-half inch long and one-fourth inch in thickness. They are found in the subcutaneous tissue of the neck and back region. They can be expelled by applying pressure on them.

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Catarrhal Otorrhea of Dogs

Otorrhea is defined as an inflammation of the external ear. It is of frequent occurrence and probably occurs more commonly than was formerly supposed; due to its being present in such mild form.

According to H. C. Stephenson of the New York State Veterinary College, it is caused by infection. This infection may follow parasitic invasion or irritation caused by dirt, foreign bodies or tumors in the ears. It may also be a sequel to distemper.

The case I shall describe was seen in the small animal clinic at the New York State Veterinary College. The dog was a middle-aged Irish setter, and when examined had a pus discharge from the left ear. An examination with the otoscope revealed ulcers diffusely distributed over the ear canal from the external opening to the tympanum. The head was held with the affected ear down, and due no doubt to intense itching and irritation, the head was shaken almost continuously. The dog scratched at the ear carefully, showing it was tender and inflamed.

Shaking the head seems to be a constant symptom with otorrhea. A dog in the clinic last year exhibited this sympton markedly. He was a black and white hound with long ears, and he was affected with catarrhal otorrhea also. His ears had been torn in some way, and due to the constant shaking, his torn ears refused to heal until the condition was relieved about a year later.

It is essential on beginning treatment to clean out the ears thoroughly. This was done in the case of the setter, by washing with ether. At other times we use small pledgets of cotton on the end of an ear probe. The exudate was copious and had a fetid odor. We stood behind the dog's head so that the bottom of the ear canal could be reached more easily. After the ear was clean and dry, medication was used. It is just as important to clean the ear well as it is to fill it up with powders and solutions.

The treatment on this dog varied greatly. Astringents, antiseptics, ointments, and dusting powders were alternated. No one line of medication seemed long effective. The ear was cleaned out daily, and first a five per cent silver nitrate solution was instilled, followed the next day by powdered tannic acid dusted in. This was continued for a while, then irradiated vaseline was applied for a time. Other substances used were: bismuth formic iodide, bismuth subgallate, five per cent tannic and salicylic acids in alcohol, Pellital ointments, boric acid powder and various other emollients and astringent powders. Treatment was continued at intervals for 18 months.

An otoscope is helpful but not essential in cases of this kind. It is well to examine the ear frequently to note what progress, if any, has been made. These cases may be very stubborn and the treatment must be varied, as the continuous use of one substance seems to do little good.

Philip C. Close,

Earlville, N. Y.

The Anatomy of the Digestive System of the Dog

THEODORE WILLIAMS,
Kansas City, Kansas

THE digestive tract of the dog is relatively short as compared with that of other animals, being only about six to eight times the length of the body; varying from less than 10 feet in the various small breeds, to more than 20 feet in the larger breeds. Being relatively short, it is comparatively easy to wash the intestine of a dog through, with a high enema, so that he will empty his stomach of its contents. This is an important aid in canine practice as one can quickly and conveniently clean out a dog thoroughly and at the same time observe the character of the dejecta. From one to three gallons of water, depending upon the size of the dog, will suffice to completely evacuate the contents of the digestive tract. The great value of this can be appreciated readily in various digestive disturbances and in suspected poisoning. This feat cannot be accomplished in any of the larger animals.

Mouth and Accessory Organs. — The mouth of a dog, unlike that of other animals, varies in shape and size, with different breeds, from short and wide to long and narrow. The cheeks are loose and capacious; readily forming a pocket for oral medication of liquids and oils. The oral cavity in most cases will admit the hand for administering pills and capsules or for an examination of the cavity. The soft palate in the dog forms a long broad partition between the mouth and the pharynx and on either side of it, in a sinus-like depression, is located the bean-shaped tonsils, red in color. They are almost concealed in the folds of the mucous membrane of the soft palate, as it is reflected on to the pharynx. The dog has 42 permanent teeth; 20 above, 22 below, there being only two upper molars on either side and three lower. Eruption is complete around the seventh month. The teeth are easily cleaned and examined. The tongue is wide and thin in front, thick posteriorly and very motile.

The salivary glands (parotid, mandibular and sublingual) are relatively small, and their location and anatomy presents very little differences from those in other animals.

Pharynx.—The pharynx of the dog is a muscular, membranous organ both of digestion and respiration. It is important to the veterinarian because of the frequency with which it is involved in the location of foreign bodies. The pharynx reaches from the mouth at the level of the mandibular articulation to the esophagus at about the level of the atlanto-axial joint. There are seven openings into the pharynx; three single median openings (mouth, larynx and esophagus), and two paired openings (nasal cavity and eustachian tubes). The pharynx, by its location, presents an ideal spot for the lodgment of bones, sharp-pointed sticks and countless other objects that the veterinarian is called upon to remove. Fortunately for both the dog and the veterinarian these objects are fairly easy to remove.

Esophagus. — The esophagus, beginning at its opening in the pharynx and extending to the stomach, constitutes the next 18 to 24 inches of the digestive tract. It is rather wide and dilatable except at its origin, where it is markedly constricted due to a transverse fold of mucous membrane. The cervical part of the esophagus is median and dorsal to the trachea, then in the posterior part of the neck, it lies just left of the trachea. It is easily palpated in this region. In the

thoracic cavity it continues in about the same position (left of trachea) passing into the abdominal cavity to the left of the median plane and immediately joins the stomach.

Stomach.—The stomach of the dog is relatively large. Its capacity will vary from 2 to 18 pints; that of a 40-pound dog being about six or seven pints. This is three times the size of the average human stomach. When full the stomach occupies a large portion of the space on the left side of the abdominal cavity extending from a point just left of the xyphoid cartilage to about under the second or third lumbar vertebra. The visceral surface faces the right and is related to the pancreas dorsally and the intestine and the left kidney, while its parietal surface contacts the liver. In an exploratory laparotomy the stomach can be palpated easily, and is readily accessible to the operator.

Small Intestine.—The small intestine is short in a dog, only about five times the length of the body and varying with breeds from 7 to 18 feet; the average being about 13 feet. The small intestine occupies most of the abdominal cavity, especially the floor on both sides, back of the stomach to the pelvic inlet. This fact must be kept in mind when making abdominal incisions and injections and care must be taken not to puncture the intestine and set up a fatal peritonitis. The location of this organ makes palpation quite easily accomplished except in very fat, old individuals. This is quite an aid to the practitioner, and if carefully and thoroughly performed it frequently determines the cause of the more common intestinal disturbances in canines—obstruction or impaction of the intestine due either to some foreign object (rags, rope, twine, rubbers, cellophane, hard dry feces, etc.). After location of the cause, a laparotomy will reveal the section to the veterinarian, who may remove the obstruction by manipulation or by removing a section of the gut and resorting to an intestinal anastomosis.

The first one to two feet of the small intestine is the duodenum, which leaves the pylorus and runs backward and dorsally on the right side to about the pelvis, where it turns left and passes forward medially and ends in contact with the left kidney, where it joins the jejunum which is found in numerous coils on the abdominal floor and is attached by a wide, well nourished, mesentery to the sublumbar region, just at the base of the left kidney. The short terminal portion, the ileum, joins the colon in the sublumbar region. The bile duct and pancreatic duct open into the duodenum from two to four inches from its origin at the pylorus, and about two inches posteriorly, the larger pancreatic duct opens into the gut. The muscular coat of the small intestine is very thick. This fact must be kept in mind in closing intestinal anastomoses with sutures and care taken that the musculature during peristalsic action will not pull away from the sutures.

Large Intestine.—The large intestine in the dog varies from less than two feet in small dogs to three to four feet in large dogs, the average being about 30 inches. Its caliber is little different from that of the small intestine. At the junction of the ileum and the colon there is an ileocolic valve, which is rather ineffective as rectal injections easily pass forward beyond this point. This makes possible complete intestinal lavage. Just at this junction and attached to the ileum by the peritoneum, is the cecum which varies considerably in size and shape in various individuals. It will be found in the right flank at about the level of the ventral end of the last rib and about two or three inches posteriorly. The location of this structure is very important in the treatment of trichuriasis. The colon is rather short and consists of three parts: (1) right, very short, running forward to the right of median plane to the pylorus; (2) transverse, crossing the median plane to the left from the pylorus, and (3) left, turns left from the transverse part and runs an almost straight course to the pel-

vic cavity, where it is continued by the rectum. The diameter of the colon is about the same throughout its course.

The rectum joins the anus to complete the digestive tube, and at this junction the epithelium contains two nut-shaped anal glands, one on either side. These frequently become impacted with a dirty-grey, fatty substance of a peculiarly unpleasant odor, become inflammed and highly sensitive and predispose the animal to constipation by retarding evacuation of the feces because of the pain they cause. Simple pressure with the fingers, in most cases, expel their contents and bring relief. It should be performed under anesthesia in severe cases.

Accessory Organs.—Associated with the digestive tract are glands essential to digestion: The salivary (already mentioned), liver and pancreas.

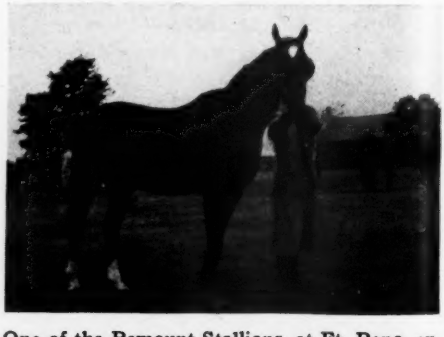
The liver of the dog is relatively large, weighing about one-half pound in a dog weighing 10 pounds and three to five pounds in dogs weighing 100 pounds or more. It has five lobes and lies a little to the right of the median plane. It lies on the parietal surface of the stomach, next to the diaphragm and is held in place by ligaments attached to the surrounding structures. The gall bladder lies between two of the right lobes of the liver and is not visible from the border of the liver. Its cystic duct joins the hepatic duct of the liver and empties into the duodenum about three to four inches from the pylorus. Affections of the liver and its associated gall bladder may result in retention of the bile and icterus. Occasionally one may find the liver degenerated. In exceptional cases the liver may be so greatly enlarged in chronic hepatitis that it may be felt on palpation. This is by no means common, however. Rupture of the liver may occur in exceptional cases.

The pancreas in the dog is a V-shaped structure consisting of two very long narrow branches which converge at a point just behind the pylorus. The right branch is the longer, lies in the mesoduodenum and extends to a point just back of the right kidney. The left branch lies along the left portion of the colon, ending at the anterior pole of the left kidney. The pancreas has two ducts that empty into the duodenum about two inches apart and about three to four inches from the pylorus.

Diseases of these organs affecting their gross anatomy are not usually diagnosed clinically.

The intestines are the habitat for numerous parasites of the dog (hookworms, roundworms and tapeworms in the small intestine; whipworms in the cecum). In giving a dog a high enema, large numbers of tapeworm segments may be washed out and some roundworms may be seen also. If the process is carried to the extent of washing through the animal, large numbers of these parasites may be removed.

A general knowledge of the normal location, shape and size of these digestive organs, will tend to make one better able to properly care for the dog when these organs may be abnormal or diseased, and is certainly of great value in treating digestive disorders. It is advisable for the practitioner to autopsy every dog that he has an opportunity to, until he has thoroughly familiarized himself with these organs as to their location normally and their size and shape.



One of the Remount Stallions, at Ft. Reno, exhibited at the Oklahoma meeting the A. V. M. A., August 27-30, 1935. **See page 422.**

Prostate Gland and Prostatitis in the Dog

Anatomy.—The prostate gland of the dog is relatively large; yellowish in color, dense in structure and is situated near the anterior border of the pelvis. The gland is divided into two lateral lobes. The capsule and stroma contain large amounts of nonstriated muscle.

Examination.—The large size of the gland in the dog makes it easy to recognize by digital palpation per rectum or through the abdominal wall at the brim of the pelvis. Palpation through the rectum is accomplished usually by the forefinger. The hand may be bare or encased in a surgical rubber glove, or a finger cot may be used. In any case the finger nail should be trimmed and the finger or finger covering well lubricated with oil or lubricating jelly. Upon introduction of the finger into the rectum care should be taken not to force it against straining of the animal. This avoids danger of rupture of the rectum. Entering the rectum and passing the finger forward to the brim of the pelvis, the gland will be located easily. Through the wall of the rectum the lobes of the gland may be clearly outlined.

A Case of Acute Prostatitis

Definition: An acute inflammation of the prostate gland.

Etiology: Prostatitis may be due to invasion of microorganisms via the blood or lymph streams (staphylococcus, streptococcus). It may be the result also of extension of infection from other structures, such as the bladder or urethra.

History: The patient was a four-year-old German shepherd, that lately had moved with difficulty, urinated frequently, had no bowel action and dragged rear parts on the ground.

Symptoms: Animal walked slowly and with a stiff gait posteriorly. The tail was carried down. The temperature was 103.5°F., and the mucus membranes of a brick-red color. There was a large, external, bilateral swelling in the perineal region. Rectal examination disclosed an enlarged fluctuating swelling, hot and painful to the touch. The swelling extended anteriorly from the brim of the pelvis into the abdominal cavity. Hard boluses of feces were found in the rectum, an indication of constipation over a long period. There was no particular difficulty in micturation. The animal was slightly emaciated. A toxemia was indicated by the rise in temperature and color of the mucus membranes. A diagnosis of acute prostatitis was made.

Treatment: The animal was given a warm enema to relieve the constipation followed by a mild laxative of mineral oil (1½ ounces). The second day the area over the swelling in the perineal region was shaved, cleansed with alcohol and painted with tincture of iodine. A sterile trocar and canula was introduced into the swelling and pus slightly tinged with blood escaped. The cavity was then thoroughly irrigated with Carrel-Dakin's solution. Following this, daily massage of the gland per rectum was prescribed. On the tenth day of hospitalization the swelling was drained again. The swelling and pain had receded in the prostate gland and there was free movement of feces without evidence of pain.

The animal was also given, three times daily, tablets of hexamethylamine (5 grains). Mild laxatives were continued to prevent constipation and absorption of toxins.

When the animal was released, one week later, all symptoms of acute prostatitis had disappeared. The dog was active and in a normal state of health.

Monroe Balton,

Wichita, Kans.

Drugs Used in Veterinary Medicine

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IX. TEREBINTHINA—the Source of Turpentine

History.—From time immemorial, the viscid juice of many of our common coniferous trees has been used in commerce and medicine. How widely it has been employed is evidenced from the fact that the product bears such names as "Venice Turpentine," "Canada Balsam," "Bordeaux Turpentine," "Carpathian Balsam," "Strasburgh Turpentine," etc. The resinous or balsamic exudation or the product resulting from decomposition due to heating the wood, known as tar or pitch has had a secure place as a remedy since ancient times. It is well known that the North American Indians employed Canada balsam as an antiseptic dressing for wounds. At one time, not far back, liquid turpentine was popular as a domestic remedy in this country for the treatment of worms; and to this day this method still has wide application by the negroes of the South. The solid residue or "rosin" was at one time also a domestic remedy for various ailments of horses, and this custom has also been carried forward to the present generation. Turpentine has been official in many editions of the U. S. P., but it has now been transferred to the National Formulary. However, its distillate, oil of turpentine and its other extractives have been retained in the U. S. P. to the present day.

Source.—Turpentine is a term which is often misapplied. In the technical sense it refers to a concrete oleoresin and not the liquid distillate which is usually indicated by the term in industrial circles. Crude turpentine is obtained from various species of pine trees as well as other conifers such as the larch. The greater part of the world's supply comes from the United States, with the Southern long-leaf pine *(Pinus palustris)* as the chief contributor. Other species are less important in the turpentine industry, and include the slash pine *(Pinus heterophylla)*, the loblolly pine *(Pinus taeda)*, and the Western yellow pine *(Pinus ponderosa)*. The remaining sources, which contribute about one-quarter of the world's output, include the pines that occur along the coastal regions of southwestern France, Spain and Portugal; Greece and Algeria; northern Italy, Austria, central Germany; northern Russia, Poland and Japan. A small supply comes from Mexico and Central America where the Mexican white pine *(Pinus ayacahuite)* thrives. Three generations ago, the greatest bulk of the crude substance was collected in North Carolina, but since then the forests of other southern states have far out-distanced the original site of production in the following order: Florida, Georgia, Louisiana, Alabama, Mississippi and Texas. Today North and South Carolina account for less than one per cent of the turpentine production.

The crude oleoresin is collected by scarifying or "chipping" the growing trees by means of a narrow-bladed axe. This process of surface cutting into V-shaped scars is repeated on the average of once a week from early spring until late in the fall, one cut being made immediately above the one of the previous week. These repeated injuries made on the outer surface of the trunk produce what is known as the "face," a light area without the outer corky layers of the bark. The tool is allowed to penetrate only superficially, since the zone from which the "gum" exudes, occurs outside of the sensitive sapwood which must not be injured. As the exudate trickles down the "face" of the tree, it is collected in a clay or galvanized iron tray or cup placed at the foot of the trunk. These vessels, which hold from one to two quarts, are emptied into a larger container such as a barrel about once each month, and in this form

the product is shipped or distilled at the place of production. The quality of the turpentine varies with the degree to which it has been exposed, since surface evaporations affects the content of the volatile active constituents considerably.

Crude turpentine consists chiefly of resin and volatile oil. A good grade contains from 16 to 22 per cent of volatile oil. To separate these constituents from one another, the original mass is mixed with water and then distilled in copper kettles of about a thousand-gallon capacity. This mixture froths readily, the older trees yielding a product which froths the more readily when placed in the still. The turpentine oil, then, runs off from the top and the water from the bottom, while the resin or "colophony" of commerce remains behind as a residue. Once the oil of turpentine is separated from the water, it can be rectified by re-distillation with a solution of caustic soda, and this is again repeated in order to insure a high-grade product for medicinal purposes. About 85 per cent of oil of turpentine is used in the paint and varnish industry as a thinner, the rest having a place in the manufacture of shoe polish, furniture polish, leather finishing, perfumes, rubber products, textiles, printing ink, marking crayons, etc. About five per cent of the output is used directly in medicinal preparations, and an additional amount goes toward the production of synthetic medicinal products such as terpin hydrate, terebene, etc.

Preparation.—Terebinthina, the oleoresin, is itself used in the preparation of compound rosin cerate. From it is obtained, as already described, the oil of turpentine otherwise known as "spirits of turpentine" and this product when redistilled in an alkaline medium becomes the "rectified oil of turpentine," which is intended for internal administration. From the ordinary oil are prepared the official turpentine liniment (35%) and Stokes' Liniment or acetic turpentine liniment (40%), besides many unofficial formulae. The residue from the distillate is the official resin or rosin, also known as "colophony." This contributes to the official rosin cerate, compound rosin cerate, adhesive plaster, turpentine liniment and chloroformic solution of rosin. There are two official products made synthetically from oil of turpentine (the synthetic form of camphor is not official). One of these is terebene, a mixture of hydrocarbons resulting from the action of concentrated sulphuric acid on oil of turpentine; and the

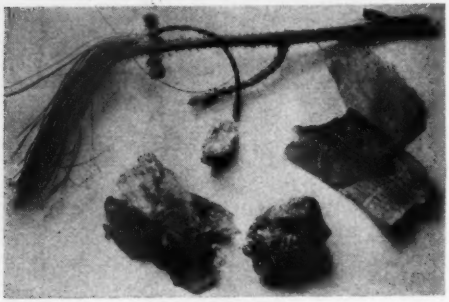
Collecting turpentine from "chipped" trees.

other terpin hydrate, a dihydric alcohol made by the interaction of oil of turpentine, alcohol and nitric acid. An official product related to turpentine is pine tar *(pix pini)*, which is the result of destructive distillation of the wood of various species of pine trees. This is usually obtained from dead trunks or branches which are rich in turpentine and the final product contains turpentine, resin, creosote and empyreumatic oils.

Terebene is a mixture of terpene hydrocarbons, chiefly dipentene and terpinene, made synthetically from the oil. It is a colorless liquid with a thyme-like odor, having a specific gravity of .86-.865, insoluble in water, and soluble in three parts of alcohol, chloroform and ether. It becomes resinous when exposed to the air.

Terpin hydrate is a dihydric alcohol,

technically known as dipenteneglycol, and having the composition $C_{10}H_{18}(OH)_2.H_2O$. It is a synthetic product of oil of turpentine or pine oil. It occurs as colorless, lustrous, efflorescent crystals or white powder, having a slight odor and slightly bitter taste. It dissolves in about 200 parts of water, 13 of alcohol, 135 of chloroform and 140 of ether. In hot water and alcohol, however,



Crude Turpentine; rosin; bark, and (above) a white pine branch.

it is much more soluble. It sublimes at 100°C, and melts at about 115°C.

Rosin is the resin left as a residue after distilling oil of turpentine from the crude terebinthina or "gum." It is shipped in wooden boxes or casks—and occurs as irregular masses varying in size. The color varies from a light amber to a dark brown, and the mass is translucent. It has a slightly aromatic odor and a pungent taste. It is freely soluble in alcohol, benzene, ether, glacial acetic acid, oils, and solutions of the fixed alkaline hydroxides. It melts at 100°C, and is powerfully adhesive. The latter property gives it a place in acrobatic and dancing performances, and also in the case of the bow of stringed musical instruments.

Properties. — Oil of turpentine and the "rectified" preparation has similar properties. It occurs as a thin, colorless liquid, having a characteristic "terebinthinate" odor and a pungent taste—the odor and taste becoming stronger with age and on exposure to air. It is practically insoluble in water, but dissolves in five parts of alcohol, chloroform, ether, benzine and fixed and volatile oils. It boils at about 155°C, and has a specific gravity of .85 to .87 and is optically active. Chemically, the oil consists of several closely related hydrocarbon compounds know as terpenes and having the basic formula $C_{10}H_{16}$. The chief terpene occurring here is one known as pinene, present to the extent of over 80%. From the examination by means of the polariscope it can usually be determined as to its source from domestic or foreign markets. Since turpentine is a highly unsaturated substance due to these pinenes, it is readily affected by such active elements and compounds as oxygen, chlorine, bromine, iodine, hydrochloric acid, nitric acid and sulphuric acid. For this reason, when it ages or is exposed to the light or air for some time it will absorb oxygen and become oxidized. At the same time, small quantities of hydrogen peroxide will be liberated as is evidenced from the fact that the cork stopper on a bottle of old turpentine will be bleached. Once oxidized, the "turps" turns to a yellowish color, and becomes more viscous and oily; and a solid white substance often deposits on the bottom of the bottle. Small amounts of acid, such as acetic acid, also are found and if the liquid is kept in a tin can, the metals will be attacked slowly and their solution will darken the oil. Therefore, oil of turpentine should not be stored in partially filled bottles or in tin cans. Small containers, full to the top solve the problem. Since the absorption of oxygen occurs the moment the exudate from the tree reaches the air, and since the "spirit" owes its superiority as a paint thinner to this same property, it can be easily understood why the "oxidized" form is undesirable, and also why it must not be used in internal medicine because of possible by-effects from the newly formed products.

Action.—Externally, oil of turpentine is known for its irritant effects particularly in dogs and horses in which this action is pronounced. The irritation, when prolonged, ends in a marked itching and inflammation, which often ends in vesication. The lesion which is thus produced is very sluggish in healing. This drug has a penetrating effect on

the skin, and is an excellent antiseptic, antiparasitic, deodorant and stimulant when not too concentrated. Internally, it depends for its action partly on its local irritant effects, inducing a sense of warmth in the stomach, increasing the secretions in the digestive tract and stimulating peristaltic motion, expelling gas and, because of its disinfectant properties, reducing fermentation where this is present. It also affects intestinal parasites. Due to reflex effects from the digestive tract, there is a stimulant effect on the heart and respiratory system. For this reason the heart is increased in its rate and force, and the blood pressure is raised by a vaso-constrictor effect provided the dose is small. Likewise, the strength of the respiratory movements as well as the rate is augmented; and when the volatile oil is inhaled, there is a stimulant and antiseptic effect on the mucous membrane of the bronchial tubes. Turpentine is quickly absorbed into the blood stream and eliminated, chiefly through the respiratory passages and urinary tract. It therefore irritates the kidneys and induces diuresis of a violent type when large doses are given, often causing pain, albuminuria, hematuria, and dark urine due to irritation of the mucous membrane and spasm of the urethra, and at times there is an odor resembling violets in such urine. In the female it may cause a dysmenorrhea or menorrhagia.

Therapeutics.—Oil of turpentine finds a wide application in external medicine. When properly diluted with such substances as linseed oil, cottonseed oil, alcohol, and the like, it is useful as a counter-irritant and stimulant. It relieves soreness and inflammation in cases of rheumatism, sprains, lameness, swollen joints, frost bite, burns, bruises and ulcerations. It is efficient as a disinfectant dressing when properly diluted with a vegetable oil in accidental or other wounds such as barbwire cuts, burns, abrasions, and harness galls. It is also recognized as effective in footrot of sheep and for destroying lice and fungous ringworms. As a counter-irritant it is recommended for relieving deep-seated pain and inflammation such as pleurisy, bronchitis, pneumonia, colic and peritonitis. In the case of tympanitis and colic, the drug is used internally as well as externally and in enemata. In chest and abdominal ailments, the turpentine stupe is the accepted method of application. Internally, the drug is given in moderate dosage well diluted with milk, gruel, linseed or cottonseed oil. It has recently been introduced in emulsified form with acacia or egg-white as the emulsifying agent. It relieves colic and tympany by its carminative effects, as well as by its stimulant effects when introduced per rectum. It is also combined with ammonia and given with an oil to cut down fermentation. For purpura hemorrhagica in horses it is combined with tincture of ferric chloride, and is reputed to give gratifying results. It is a worth-while anthelmintic for roundworms in dogs, horses and swine; and has been useful in intratracheal treatment of lungworms of sheep and cattle. Occasionally, some practitioners employ the drug in treating chronic diarrhea and dysentery of horses and cattle. The drug has, until recently, been used as an antiseptic and stimulant expectorant, internally in bronchitis and purulent conditions of the lungs, but today is largely replaced by terebene or terpin hydrate which appear to exert a more profound influence in such cases. The oil is also used

DOSE TABLE

	Animal	*Apothecary*	*Metric*
Oil of Turpentine:			
	H	℥ i-ii	30.-60.
	C	℥ iss-iii	45.-90.
	S	℥ i-iv	4.-15.
	D	m x-zss	.6 - 2.
Terebene:			
	H	℥ ii-vi	8.-24.
	C	℥ iii-℥i	12.-30.
	S	℥ ss-i	2. - 4.
	D	m v-xv	.3 - 1.
Terpin Hydrate:			
	H	℥ ss-i	2. - 4.
	C	℥ ss-iss	2. - 6.
	S	gr. x-xl	.6 - 2.6
	D	gr. v-xx	.3 - 1.3

as an inhalant for respiratory conditions along with the internal treatment. It is also indicated for its stimulant effect on the urinary tract in case of pyelitis, cystitis and amenorrhea. It is contraindicated in acute nephritis or gastritis and similar inflammatory states. The drug should not be used in animals being milked or those about to be slaughtered.

Toxicology.—Externally, oil of turpentine when used too strongly produces marked pain, inflammation, vesication and ulceration. The affected parts are slow in recovering. Internally, overdoses cause gastroenteritis with great pain, nausea, purging and at times intestinal ulceration. Toxic doses also lower the blood pressure and depress respiration, and the nervous system becomes involved resulting in stupor, unsteady gait, coma, sensory paralysis, absence of reflexes, and at times convulsions. There is a marked nephritis, suppression of urine and hematuria, the urine having a violet scent. On autopsy, the lesions are gastroenteritis and fatty degeneration of the liver, kidneys and muscles, especially if the oil has long been used. There may also be congestion of the lungs. The treatment should look toward rapid elimination by large draughts of water, as well as demulcents and anodynes to relieve the great pain. In the latter stages supportive treatment is imperative; keep up respiration and cardiac tone.

' ' ' '

Do You Remember?

1. Question. Do the corpuscles or the plasma make up the greater volume of the blood?

Answer. The corpuscles compose about a third of the volume of the blood, and the plasma approximately two-thirds of the volume.

2. Q. What is the normal pH of blood?

A. The hydrogen-ion concentration of normal blood constantly remains very near 7.4, which is slightly alkaline.

3. Q. Are the red blood cells of the chicken nucleated?

A. Although the red blood cells of mammals are non-nucleated, those of the chicken and most of the other lower animals are nucleated.

4. Q. What is meant by the maximum resistance of erythrocytes?

A. The maximum resistance of red blood cells is that point or degree of concentration of a sodium chloride solution in which all the red blood cells are hemolyzed. For the red blood cells of the horse and ox, this point is about a 0.42% solution of sodium chloride.

5. Q. What is oxyhemoglobin?

A. Oxyhemoglobin is a loose combination of hemoglobin with oxygen—formed in the lungs. It is reduced to hemoglobin by the tissues while traversing the capillary system.

6. Q. Of what value is the hemin test?

A. The hemin test is of the greatest value in forensic medicine when it is desirable to differentiate blood from similar appearing substances. This is done by heating a small amount of the suspected material with a grain of sodium chloride and a drop of glacial acetic acid; when blood is present, rhombic crystals of hemin are formed, which may be identified microscopically. This test is frequently called Teichmann's test.

7. Q. How many red and white blood cells are there per cubic millimeter in the horse? ox? and dog?

A. In the horse there are about 7,000,000 red and 10,000 white blood cells per cubic millimeter of blood; in the ox there are about 5,700,000 red and 8,000 white blood cells per cubic millimeter. A cubic millimeter of blood from the dog contains about 6,600,000 red blood cells and 12,600 white.

8. Q. Will blood flowing over the edges of a wound clot quicker than that drawn through a needle or cannula?

A. Blood coming in direct contact with the edges of a wound clots quicker, possibly due to the liberation of thrombokinase—an element necessary to clotting—by the injured cells.

Wesley O. Keefer.

Akron, Ohio.

Pasteurized Milk Best

The Committee wishes to stress the importance of properly pasteurizing or boiling all milk supplies either commercially or at home, because only by this means can maximum safety be assured. Every precaution with which milk is surrounded, including pasteurization, is of course subject to "slips" in operation. Health examinations of herds and employes occasionally fail to disclose existing disease or carrier conditions, and even frequent sanitary inspections do not prevent occasional violations. This includes the operation of pasteurization plants as well as those at farms; but the one thing which differentiates pasteurization from all other protective measures is that, while all other measures may fail to protect entirely even if they are properly applied, pasteurization will always protect if it is properly applied. Even if we examine every milker with the most modern methods, we will occasionally miss disease or carrier conditions; but if we assure ourselves that the proper temperature has actually been applied to milk for the proper time, we can be quite sure that the infection to which it may have been exposed up to that time has been nullified. It is for this reason that the Committee believes all milk should be pasteurized or boiled before it is consumed.

In this connection the Committee wishes to stress the importance of proper production methods not only for any milk which is sold raw but also for all milk which is to be pasteurized. It has been repeatedly declared that pasteurization, while an indispensable additional safeguard, can never be substituted for proper production methods. Milk which is neither properly produced nor properly pasteurized is doubly dangerous; but milk which is not properly produced, even though it may apparently have been properly pasteurized, is still not without a modicum of danger, since even the pasteurization process is directed by human hands and, therefore, to some extent subject to human frailty.

Again, if we are to inculcate in the mind of the consumer the proper respect for and confidence in pasteurized milk, it must be possible to assure the consumer not only that the process has been properly carried out but that the milk was of high quality both from the sanitation and esthetic points of view before the pasteurization process was applied. Only in this way can we as health authorities recommend with propriety an increase in the demand for pasteurized milk.—From a report of the Committee on Milk, Conference of State and Provincial Health Authorities, 1935.

Coccidiosis in Small Animals

Coccidiosis is a protozoan disease affecting nearly all domestic and wild animals. In the case of dogs and cats it is the most common and important protozoan disease.

Coccidial infection in small animals probably occurs throughout the world. Since little work has been done on this disease, its distribution and frequency is not definitely known. Many rabbits die of the disease yearly, causing great monetary losses. It is probable that many dogs and cats are rather commonly affected with coccidia, although not many cases are diagnosed as such.

In the report of the small animal clinic of the New York State Veterinary College for the fiscal year July 1, 1931, to June 30, 1932, five cases of coccidiosis in dogs were reported; all recovered. For the same period the diagnostic laboratory of the college reported finding coccidia in feces from four dogs.

An examination of two hundred dogs in Detroit in 1917, showed 15 or 7.5 per cent infected with coccidia.

Coccidia produce the disease known as coccidiosis, mainly by their action on the alimentary tract. The protozoa cause extensive destruction of the epithelium of the intestines, causing an acute diarrhea, a hemorrhagic enteritis, or just a general run down condition; anyone of which might cause death. An animal heavily infected with coccidia is droopy, inactive and greatly emaciated. In dogs and cats the disease may not manifest itself. In some cases an animal,

upon autopsy, is found to be infected with coccidia, and at the same time have some other disease such as distemper. In such cases it may be impossible to say just which disease caused the death, but certainly one can say that the coccidial infection was at least a predisposing cause of death.

The host may survive the acute phase of the infection and pass into a milder, chronic stage. Many animals, in apparently perfect health, harbor coccidia. It is probable that, having survived an acute infection, they have become adapted to the parasite and able to repair the damage done to the cells as fast as it occurs.

A positive diagnosis may be made antemortem, by finding oocysts in the feces of the suspected patient. After death the diagnosis is made by a microscopical examination of a section of the small intestine of the affected animal. Oocysts are found in the epithelial cells.

Coccidia of small animals belongs to the genus, Eimeria species, Canis (dog), Felina (cat), and the genus, Isospora, species Bigemina, Rivolta and Felis (dog and cat).

No intermediate host is known for coccidia. The oocysts pass from the intestines with the feces and are taken into the host by ingestion. The coccidia go through many stages of development. The oocyst of the genus Isospora produces two spores, each containing four sporozoites, while the oocyst of the genus Eimeria produces four spores and eight sporozoites.

The infested animal may die or show only the symptoms and then, in the case of a young animal, have its growth stunted, or it may become a carrier without showing symptoms of the disease.

Infection is spread by the feed or drinking water contaminated with oocysts from the feces of sick animals or carriers. It is favored by weakening influences, such as sudden change of temperature, or feed, long transportation, or the poor condition of the animal. Young animals are more susceptible than mature animals.

A dog that was a patient in the small animal clinic of the New York State Veterinary College last year, was seen eating its own feces. This caused repeated reinfestation and its condition remained poor until this was corrected.

Henry found a single attack of coccidiosis in guinea pigs produced an immunity against coccidia. His finding has not been confirmed.

At the first signs of coccidiosis in a kennel of dogs or in a cattery, all animals not affected should be moved to new quarters, and kept under the strictest sanitary regulations possible. The former quarters should not be used for some time, and not until they have been thoroughly cleaned and disinfected. By continuing sanitary measures the disease may be eradicated from a group of animals. To further insure the protection of the noninfected animals, keep the food and water from contamination.

It is difficult to determine the efficiency of a remedy for a self-limiting disease such as coccidiosis, because even when an animal becomes negative after treatment, there is no way of determining whether or not it was at the stage in which it would have become negative without treatment.

There are few references to the treatment of coccidiosis. One reference referred to the use of Rotenone as a curative measure. It may be beneficial. A practitioner located on Long Island reports good results from the use of Azamine in puppies. Since coccidiosis is a self-limiting disease, in most animals, attempts at medication may be impracticable. The disease usually runs its short course and disappears without treatment, and in many cases without doing much harm.

As in the case of many other diseases, coccidiosis is more easily controlled in a group of animals by prevention than cured by the use of drugs.

Coccidiosis probably is not considered by many veterinarians as a disease of dogs and cats. Although it is not diagnosed very frequently at present, its prevalence may increase or the disease may be found to be present in more of our patients than we realize. It is one more disease we should look for. A correct diagnosis should be made upon the first examination.

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Abstracts

Biological Consideration of the Anus of Dogs and Cats

The anus and its accessory organs function to keep the digestive tract sealed until the fecal residue is ready to be excreted.[102] In addition the anus forms the connecting link between the rectal mucosa and the external skin. It is characterized by a transitional zone the so-called cutaneous mucosa, forming a circular cushion and possessing circumanal glands. The latter do not become completely developed until sexual maturity is reached. With each contraction of the anal sphincter, these glands excrete a strong smelling secretion, specific for each individual. The ridges of the zone columnaris of the cutaneous mucosa extend for a short stretch caudalward, forming pockets, which together with the *valvuli semilunares glissoni* are apt to retain foreign bodies, causing the dog to seek relief by skidding back and forth upon its anus. In the cats the zone columnaris is weakly developed. The pressure of the fecal column upon the anal wall stimulates secretion of the anal glands, thus facilitating the onward gliding and expulsion of the fecal column. Additional lubrication is provided by the secretion of the anal pouches and the circumanal glands. The anal pouches are located on either side of the anal ring between the wall of the anus and the *musculus sphincter ani externus*. The anal pouches collect the secretion of the sebaceous and sweat glands, mixing them with cast off epithelial cells from the lining of the anal pouches, and with large numbers of bacteria. The latter function in the decomposition of the epithelial keratinous masses and in the formation of a characteristically smelling fatty pulp, the biologically important scent. Secretion of the anal pouches sets in with the beginning of sexual maturity. During heat the anal pouches become enlarged and tightly filled. In the period between heat, the consistency of the secretion differs. The secretion of the anal pouches and of the anal glands contains large amounts of trimethylamine and other products of decomposition; they, unquestionably, contribute to the preservation of the species, facilitating the meeting of the sexes through the scent. Beyond this, the secretion, most likely, possesses also characteristics, specific for each individual, for it may be daily observed that dogs either wag their tail or growl when smelling secretion laden feces of members of their species.

The problem of extirpation of the anal pouches of cats has not been solved successfully.

[102] Gran, H. 1935. Der After von Hund und Katze unter biologischen und praktischen Gesichts punkten. (Biological consideration of the anus of dogs and cats.) *Tierarztl. Rundsch.* 41(22):351-354.

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Artificial Insemination in Disease Prevention

In herds suffering from contagious diseases of the sexual organs, the best way of checking the spread is by means of artificial insemination, eliminating all direct contact between bull and cow.[103] The semen is to be collected by means of an artificial vagina. To one end of the latter the receptacle for the sperma is attached. The other end is greased with vaseline. When guiding the penis into the artificial vagina, special attention is to be paid that in manipulating the penis the prepuce alone is touched with the hand, but never the penis itself, else some bulls will not ejaculate. The semen from the second service is usually more plentiful, more milky and of a much better quality regarding number and motility of the sperma, than from the first service which is more watery. The quantity of semen varies between from 4cc to 8cc. The semen is examined microscopically, then diluted with saline solution and re-examined. For the injection into the cervix of the cow, the semen is diluted to five times the original volume. About 1½ to 2cc is injected, using a glass syringe.

In a community in which the cattle were heavily infected with trichomonads, 98 cows were served by means of artificial insemina-

[103] Fuchs,—1935. Die Bedentung der kunstlichen Besamung des Rindes fur die Bekampfung der Deckinfektion. (The value of artificial insemination on the fight against contagious diseases incident to mating.)

tion. Of these cows, 78 were visibly in heat, while in the other 20, the heat was fading out. Of the former 72 became pregnant; 14 of them had previously been bred repeatedly without success. Not counting the 20 cows in which the heat had been fading out, the artificial insemination resulted in 93.6 per cent pregnancies.

Prophylaxis of Psittacosis

Psittacosis[104] is a highly contagious disease, of various species of the family Psittacidae, virulent, inoculable and spontaneously transmissible to man. It was first recognized in 1879 by Ritter who noticed that its occurrence in man was associated with importations of parrots. Nocard described the *Baccillus psittacosis* as the determining factor in 1892. In was not, however, until the epidemics of 1929-1930 that various authors incriminated other organisms and particularly a filterable virus.

The disease is known in Germany, England, Austria, Switzerland, Holland, Denmark, and in both North and South America.

The symptoms in man resemble those of typhoid fever or pulmonary influenza and pneumonia. The pulmonary manifestations are alarming, the mortality running about 33 per cent. Treatment is often inefficacious.

Psittacosis must be regarded as a worldwide disease whose etiology remains obscure in spite of much research. In France the importation of parrots and other species of the family is prohibited, as are also feathers unless disinfected at the port of debarkation by methods prescribed by the Minister of Agriculture. It is doubtful, however, whether these restrictions are strictly enforced, as in 1934 out of a family of six who attended a traveling circus, five fell sick of the disease, twelve to fourteen days afterward. One of them died and the others passed through a long convalescence. As the disease is not mentioned in the list of contagions, the sanitary service is without authority to act as the laws apply only to animals transported for sale.

[104] Gerard, P. Prophylaxie de la Psittacose. *Bulletin* de l'Académie Vétérinaire de France, 8:2, April, 1935.

How Bovinae Exteriorize Pain

The legendary placidity of the bovine species and their apparently blunt sensibility does not prevent the domestic cow from manifesting its painful sensations. The painful manifestations are classed by the author[105] into three heads: moans, attitudes and gestures.

Moans are mostly expiratory groans of variable intensity, indicating serious trouble in the viscera or organs governed by the vagus or spinal nerves, affections that are generally traumatic: abscess of the lungs or pericardium from foreign bodies or pericarditis and pseudo-pericarditis of the same nature, severe irritations of the esophagus or tracheo-bronchial tree, esophageal perforations, costal fracture, etc.

Attitudes comprise unnatural positions of the head and neck, soiled nose, photophobia, opisthrotonos, arching the back, prolonged decubitus, abnormal positions of the legs, and facial expressions of agony. Each one of these has its interesting semeiological interpretation.

Gestures are irregular, isolated kinetic manifestations. There are *provoked gestures* —movements of retreat, defense and vengeance induced by explorations, pressure, flexion, percussion. Their interpretations are elementary. *Per contra,* there are *spontaneous gestures* the interpretations of which are delicate and subject to error by the novice. Sucking, for example, is pathognomonic for foot and mouth disease. Grinding the teeth is a bad sign which should direct attention to the thoracic or gastric viscera. True emesis is rare in bovines; the one generally observed is a regurgitation provoked by cardiac or esophageal lesions. Colics which are less frequent and dramatic than in the horse, can translate an intestinal distress only when the kidneys, bladder and uterus have been eliminated. Pawing, lunging, straining, laming and swinging the tail are all manifestations of pain "by default."

The author also points out the negative

[105] Pineteau, Maecel. Comment les bovidés extériorisent la douleur. Thèsis, Alfort, 1933. Reviewed in *Revue Vétérinaire et Journal de Médecine Vétérinaire,* 87:5, May, 1935.

signs, that is to say, the disappearance of all normal movements caused by pain. In applying the principles of physiology, these are easy to interpret. There are, however, other particular cases to keep in mind. Cattle will remain standing after the application of a painful revulsive; bulls will refuse to serve a cow when affected with balanitis or when rearing is painful, and oxen may refuse to pull in the yoke from discrete or clandestine lesions at the base of the horns.

Pr. Douville who reviews the thesis adds: "The thesis constitutes a chapter of clinical bovine semeiology that students and young practitioners will read with profit. . . . It is work that deserves to be cited and we hope that it will be followed."

* * * *

Test of Anthrax Prevention Agents

Between 1925 and 1932 a number of commercially prepared anthrax biologics were tested to determine their immunizing value, cattle, horses, and sheep being used as test animals.[106] In these tests which for the greater part were conducted separately, anthrax bacterin (washed culture), anthrax-spore vaccine (intradermic), anthrax-spore vaccine in saponin solution, anthrax-spore vaccine (single injection), and anthrax-spore vaccine (double injection) possessed high immunizing values. Anthrax aggressin exhibited some immunizing value, whereas anthrax bacterin (whole culture) produced comparatively little. A total of 13 tests were made with 88 principal animals and 101 controls. In 1933 and 1934 a series of comparative tests were made of six commercially prepared anthrax biologics to determine their relative safety, sensitizing effect, rapidity of immunity production, and the degree and duration of immunity which they produced under experimental conditions in which the experimental animals (sheep) had had no previous contact with anthrax infection. The products tested were antianthrax serum, antianthrax serum and anthrax-spore vaccine in combination, anthrax-spore vaccine (single injection), anthrax-spore vaccine (intradermic), anthrax-spore vaccine in saponin solution, and anthrax bacterin (washed culture). This information was sought through a comparison of the immunities produced by those biologics at 4, 16, 108, 155, 300, and 365 days after vaccination. The tests were divided into three experiments, 250 sheep being used, 71 in the titration of the exposure cultures, 149 as principals, and 30 as controls.

None of the biologics produced any ill effects in the test animals. None of the products produced any evidence of sensitization to anthrax. Antianthrax serum and anthrax-spore vaccine (intradermic) were the most rapid in producing immunity, complete protection having been established at four days after vaccination.

Each of the biologics produced complete protection for some time during the testing period. Antianthrax serum produced the shortest immunity—less than 16 days' duration—whereas anthrax-spore vaccine (single injection) and anthrax-spore vaccine (intradermic) produced the longest immunity, being complete at 300 and 360 days after vaccination. Anthrax-spore vaccine (intradermic) produced the most consistent immunity, there being 100 per cent survivals at 4, 16, 108, 300 and 360 days after vaccination and 83 per cent at 155 days.

* * * *

Psittacosis

Although psittacosis was known prior to 1929,[107] the epidemic of that year and the attendant publicity brought the disease to the attention of almost every physician and health officer in the country. There have been repeated occurrences during the intervening years, but the fact that the mode of transmission of the disease and the susceptibility of various species have been discovered and practical methods of control have been instituted indicate that progress has been made in the attempt to eliminate it as a factor in our national health. Indeed, a recent report describes the successful vaccination of human patients against the dis-

[106] Gochenour, W. S., Schoening, H. W., Stein, C. D., and Mohler, W. M. Efficacy of anthrax biologics in producing immunity in previously unexposed animals, U. S. Dept. Agri. Tech. Bul. No. 468, 4 fig. 1935.

[107] Editorial, *Jour. A. M. A.*, 102:23.

ease. The present status of psittacosis from various points of view has recently been summarized by Hoge.[108] The incidence of the disease is generally decreasing; whereas in 1932 there were seventy-six cases and seven deaths, in 1933 only fifteen cases, of which four were fatal, came to the attention of the authorities. This year, however, up to the middle of March, twenty-seven cases and eleven deaths were recorded. As the epidemic of 1929-1930 was shown to have its origin in infected parrots, the disease was called "parrot fever." It has been demonstrated, however, that the most important vector of psittacosis is the shell parrakeet, principally because this bird enters into commerce in large numbers. On the other hand, it is known that all or nearly all birds belonging to the family Psittacidae are actual or potential carriers of the disease. Up to the present, a large proportion of the human cases of psittacosis have occurred in California. The circumstance is correlated with the widespread occupation of breeding and rearing psittacine birds in that state. The fact that all reported human cases of the disease occurring in the United States have been traced to California-bred birds indicates the importance of strict control of the aviaries in those sections where the climate is favorable to the rearing of these birds.

Psittacosis is caused by a filtrable virus that appears to be readily passed from an infected bird to a healthy one, young birds being more susceptible than old birds. Apparently the virus can pass from birds to man by direct contact or through the lungs. The period of incubation is usually about twice as long in the birds (approximately fifteen days) as in human patients; in man the disease simulates pneumonia but with a marked dissociation of pulse rate and temperature. The virus can usually be demonstrated in the sputum and, when injected into mice, produces the disease in these animals. In the tissues of man, mice and bird with psittacosis there usually occur the so-called L. C. L. bodies, which can be stained and observed microscopically and which may be one form assumed by the virus in a developmental cycle.

Psittacosis presents a unique problem in public health control. On the one hand, the known facts definitely connect the presence of infected psittacine birds with the spread of the disease to human beings. On the other hand, the fact that most of those rearing birds are in business in a small way, together with the hesitation in accepting advice resulting in financial loss, has rendered regulation difficult. However, certain states and Hawaii have already prohibited the importation of parrakeets. As it has been found that psittacosis is endemic in California aviaries, both federal and state regulations have been formulated to permit the shipment only of birds that are certified to be free from the disease by the state health officer.

Despite the difficulties arising from lack of fundamental knowledge of the disease as well as from opposition to regulation, the results of the efforts to control psittacosis have been favorable. However, there is presented here a situation of extremely grave possibilities. Hoge states that "few diseases can claim a more diversified list of susceptible species." Recently the chicken has been shown to be susceptible to the disease both by inoculation and by feeding infected material. The widespread use of poultry as human food and the necessary contact with chickens in the egg industry emphasize the great potential danger from this source alone. The accumulating facts indicate that in uncontrolled psittacosis there exists a serious menace both to the public health and to commerce.

[108] Hoge, V. M.: Pub. Health Rep. 49:451, April 6, 1934.

Book Review

Veterinary Military History of the United States, with a Brief Record of the Development of Veterinary Education, Practices, Organization and Legislation, in Two Volumes, by Louis A. Merillat, Lt. Col., Vet.-Res., Chief Veterinarian, First Army, American Expeditionary Forces and Delwin M. Campbell, Lt. Col., Vet.-Res., Editor, *Veterinary Medicine.* Sponsored by the American Veterinary Medical Association, 1160 pages, profusely illustrated. Published by Veterinary Magazine Corp., Chicago, 1935. Price $10.00.

This is truly a labor of love. "The undertaking we have volunteered to assume is not a pleasant one." The labors involved have been stupendous; toes have been stepped on, but never ruthlessly trampled; and the whole monumental work is permeated with evidence of a deep and abiding affection for the veterinary profession.

The authors are pre-eminently qualified for the task—a statement that could confidently have been made before the beginning of the work, but thoroughly demonstrated in the History itself. They are first and foremost, veterinarians possessed of education, technical training, broad experience and practical ideals. They are familiar—but not contemptuously—with military matters, and practically and professionally patriotic and self-sacrificing. They are not professional historians—does one know of a veterinarian who is?—but their History proves beyond per-adventure of doubt that they know history and how to record it.

History is a social science. As a science it should be devastatingly truthful, and its social implications should be constantly in perspective or in focus. The authors have produced a work that should be studied by the writers and students of classical history. Their picture is never out of focus and its perspective is never distorted. Their arrangement is as smooth as could be expected, their choice of material judicial, their documentation clear and irrefutable, their grammar, rhetoic and style such that perusal of hundreds of pages is a pleasure. The reader can be assured of freedom from petty irritations due to misspelling, poor typography, and other evidences of carelessness.* Special mention must be made of the illustrations. They are numerous, uniformly of high quality, and pertinent to the text. Without the text they would make a notable record in themselves.

One of the first things that will tend to get "under the skin" of most readers is the word "military" in the title. Why a military history? A history of veterinary medicine by all means, but why "military"? No one is more prone to develop a temperature over this matter than is the reviewer. He is perfectly satisfied with the wisdom of the authors in their decision. They have given us a good—very good—general history in spite of, or perhaps, more fairly, because of the title.

Never has a military history been written which glorifies things military less. It shows equally well and clearly the stupidities of both war and pacificism. The History is especially commended to all who seek a clearer viewpoint of military preparedness.

The History is built upon a chronological basis. Book I deals with early history of veterinary medicine and some well selected background material. Duplication is avoided as evidenced by the omission of much medical history—there are some excellent histories of medicine—and the recognition of the existence of an excellent history of the Federal Bureau of Animal Industry. The authors would undoubtedly disclaim any title of philosopher, yet their Military History is replete with such wisdom as: "War destroys what science creates and conserves;" and their quotation of Vegetius, "the father of the veterinary art of the present day;"—"knowledge is never mean nor contemptible and there can be no shame in practicing a profession that saves the State from loss;" and this: "Next in human stupidity to neglecting the study of animal disease is forbidding it."

*The reviewer owes it to himself as well as to the History to state that it has been his rare privilege and pleasure to read every page of the History in page proof only, hidden away in the north woods of Michigan one hundred and fifty miles from any facilities—clerical, library, or consultation with colleagues. He is assured that the format of the finished work will be acceptable.

The authors credit the Latins of the post-Renaissance period with having "set the foundation for a complete segregation of veterinary medicine from other arts," and complain that "the agriculture - veterinary alliance of the United States is but a continuation of a custom laid down in English books and their American editions on agriculture or horsemanship. . . ." Attention is called to the "discovery of Germany" by the American veterinarian and the consequent effect in counteracting the English influence.

The total lack of military preparedness of this country up to the Civil War period is well illustrated in the account of the veterinary arm of the service. That the authors fail to find much encouragement in the development of the veterinary military history of their country is indicated in a quotation from Book I, page 50: "General mobilization would find the veterinary profession, as constituted at present (1935), as insufficient and unprepared as it has been in former times. 'We—the Unready' is a graphic caption for a discourse on the veterinary profession of this country at this hour."

As the story unfolds and the authors unsparingly — but fairly — picture the veterinary participation in the military history of the United States, both in times of peace and war, one must conclude that they are only skillfully holding up a mirror to the century and a half panorama and one cannot blame them if there comes to mind the story of a backwoods mountaineer who one day found a mirror which a tourist had lost.

"Well, if it ain't old dad," he said as he looked in the mirror. "I never knowed he had his pitcher took."

He took the mirror home and stole into the attic to hide it. But his actions didn't escape his suspicious wife. That night while he slept she slipped up to the attic and found the mirror.

"Hum-um," she said, looking into it, "so that's the old hag he's been chasin'."—

It isn't a pretty picture, but history is a social "science," not a fine art. The authors at no time gloat over the record; like surgeons, they anesthetize and operate with keen scalpels and swift strokes.

One of their chapters is introduced by a quotation—each chapter has such a pertinent introductory quotation — from Van Loon: "It is more important to 'feel' history than to know it." Veterinary Military History is written with knowledge seasoned with feeling, but rarely—and perhaps never —can one fairly accuse the authors of exhibiting undue emotion.

Book II continues the story of the early army veterinary service and depicts the veterinary service of the civilian population, showing—as elsewhere in the story—the interrelationship of civilian and military professional problems. "The veterinary profession may be pragmatic, but it has never been impractical. It has worked close to the hearts of the people, quite unobserved, cultivating a science as old as civilization." "What an opportunity for investigation was offered by the milk sickness plague that depopulated whole townships of Indiana of its bovine and human inhabitants!" "In the annals of veterinary medicine there is no paradox more strange than the failure to establish a veterinary service among the early pioneers. . . ."

The retention of the cavalry arm of the military service is analyzed and approved in a convincing manner. A picture of Grant is drawn that may be unique and unfamiliar to historians. An unhappy contrast is made between our veterinary service in the World War and that of British and Continental powers, and the historical background is painted in with consummate skill.

This word picture of the pre-Civil War veterinarian is a classic: "Making dramatic diagnoses at sight; applying treatment with amazing confidence; framing clever excuses for failures, strutting over the cures were fine arts among the animal doctors in this period." The government is blamed for not encouraging veterinary education. The military service could not rise above the civil service, but "modern armies should, and do, set the pace in various fields of practice and investigation. . . ."

Book III covers the Civil War and Reconstruction Period. If the record during this period had measured up to the recording in the History, we might well be proud

of it; but it is only a sorry tale well told. However, the post-war period did reveal bright spots, or signs of life, at least. Note is made of the first veterinary columnists, and the coming to America of some distinguished European veterinarians.

The period between 1879 and 1901 is covered in Book IV. The unhappy status of the army veterinarian and futile attempts to improve the service are recorded, not with pride, but with historical accuracy; and, as all through the History, it is demonstrated that history is biography recorded in a large way. We have, woven into the History, a remarkable collection of biographies of noted veterinarians and the story of how they made veterinary history.

The authors make it clear that they are not satisfied with the setting for American veterinary education and animal disease control work: "So we see today, in most of the states, the official veterinary service a part of, and subservient to, the agricultural department, and in most universities having a veterinary school, we find it a part of the college of agriculture; in no case a division of the college of medicine where it historically and logically belongs." Is this a challenge to a debate?

The story of the veterinarian in the Spanish-American and Philippine wars contains nothing to make the profession swell with pride. A chapter by Col. J. P. Turner makes interesting reading and also should make the veterinarians' blood boil.

The story of the development of civil veterinary medicine in this period is one of the best in the entire work. Wisely no effort is made to give an exhaustive account of the problems and achievements, as well as failures, in animal disease investigation, nor is an attempt made to write a textbook on veterinary practice of medicine and surgery. The account of private veterinary education, distinctly an American institution, is told with keen insight, surprising frankness, and forthright fairness. Condemnation of the States—education is a State, not a Federal function—in this connection is well directed. "The States not only gave them (the early private institutions) no support, but paid them no attention. A bit of moral support would have encouraged them. The states had other plans. Theirs was to protect the livestock industry against disease by teaching the owner how. The idea seemed plausible and has never died out. It was then and is now the politician's system of veterinary medicine and, be it said, agriculture's method also." This is a historical point of view and contains far more than a morsel of food for thought.

The period covering the first decade and a half of the Twentieth Century, treated in Book V, deals with the work of army veterinarians and the efforts to obtain more satisfactory army legislation, which was participated in by that notable group of veterinarians, some of whom are now active, but alas, many of whom have written their final page of history. Huidekoper had given way to Hoskins (the elder). The A. V. M. A. was active and at times ineffective. Politicians with myopia were matched by prominent veterinarians with astigmatism. But we are concerned only with the admirable way in which the story is told. The historian may sometimes make history (Xenophon, Caesar, Wilson), but his job is to record it.

State veterinary education is treated fairly if not sympathetically, in proper perspective without retouching the negative. The picture does not flatter. "Congress made liberal appropriations for veterinary education (research in animal diseases), but the states misapplied the funds. Out of millions appropriated, the land-grant colleges produced no veterinarians available to the livestock industry. . . . The tendency to teach veterinary art to stockmen instead of making veterinary practice attractive to larger groups of professionally trained veterinarians remains unchanged." The Federal government builds up, the States tear down the veterinary service. Veterinary medicine weds agriculture. It is devoutly to be prayed that every veterinary educator and agricultural statesman will read this chapter and ponder over it.

The treatment of the history of veterinary periodicals includes much material with which even well-informed veterinarians are not familiar. The history of veterinary, na-

tional, state and local organizations, likewise, will prove to be a valuable record for all time. The World War period (1916-1920) is covered in Book VI. The delay and incompetence in organizing an army veterinary service is handled without gloves. Lieut.-Col. C. J. Marshall contributes a lucid chapter on his experiences, in the Surgeon General's office. Major C. E. Cotton tells in his usually forceful style his experiences as a General Veterinary Inspector.

Opinions may differ as to how glorious was the rôle played by the veterinary corps in the World War, but it can be safely predicted that the recounting of the story in the History will be universally adjudged masterful. The vigorous whack taken by the authors at the Agricultural Extension Service will be heartily approved in some states, not thoroughly appreciated in others, and condemned in a few. "One of the inflictions that came upon the country as a direct result of the war, was a group of public employes known at that time as county agents and since by the more dignified term of farm advisers." Perhaps criticism of this group should have been strictly limited to matters at the points of contact with the veterinarian. Historians should be careful, but not afraid, however.

An illuminating chapter on veterinary training schools organized by the Veterinary Corps during the World War stimulates the reviewer's mouth to water for more of the spicy reactions of Maurice C. Hall. Possibly the authors with better self-control were under the spell when they wrote: "Moreover, the veterinarian is by nature a sensitive man, sensitive to snubs and indignities too often thrust at his calling by loose-talking aristocrats. To him seclusion has charms the limelight destroys. He has been a stoic in three wars within the memory of living men and will be ready when the next call to arms sounds off."

If the reader seeks bright spots in the activities of the Army Veterinary Service, he need not be disappointed. "Credit for the splendid achievement of the Meat Inspection Service is due chiefly to the late Major George A. Lytle." And equally meritorious was the work of Gilliland, Kelser, Hardenbergh, Marsh, Graham and others in organizing the army veterinary laboratory service.

After the war the fifty-year-old battle with Congress for an adequate army veterinary corps was resumed. Readers of the History (may they be legion!) will be surprised to find in this chapter an account of the development of commercial veterinary medical establishments. Certainly the appraisal of these concerns is eminently fair. It is suggested that the reader consider the "construction" difficulties of a historian, when he puzzles over the sequence, results and subject matter arrangements of the History.

The first volume contains 620 pages, every one of which should be recommended to the prospective and enrolled veterinary student, to students of history, to livestock men, to military men, to politicians, and—why not? —to the general thoughtful reading public. In this volume are to be found a deal of tabulated material such as follows:

1. A list of historical books.
2. A chronological brief of the era of veterinary medicine.
3. Veterinary works published in the pre-Civil War period.
4. Chronological table of founding of foreign veterinary colleges.
5. Tabulated history of the veterinary colleges of North America (furnished by Dr. J. P. Foster).
6. List of private schools with pertinent data.
7. A summary of the achievements of the agricultural experiment stations in veterinary research for the period 1905-'06.
8. List of state schools with pertinent data.
9. Veterinary works by American authors 1861-1900.
10. List of meetings of the United States and the A. V. M. A.
11. List and date of organization of State Veterinary Associations.

Ward Giltner.

East Lansing, Mich.

(*To be continued with Volume II in the next issue*)

ARMY VETERINARY SERVICE

The promotion of the following-named officers of the Veterinary Corps is announced:

1st Lt. Maurice W. Hale to grade of captain with rank from July 25, 1935.

2d Lt. Russell McNellis to grade of 1st Lt. with rank from Aug. 1, 1935.

Major Mott Ramsey, in addition to his duties at Jefferson Barracks, Mo., is assigned to duty in the office of the quartermaster, St. Louis, Mo.

Major Paul R. King, having been found by an Army Retiring Board incapacitated for active service on account of disability incident thereto, and such findings having been approved by the President, his retirement from active service on August 31, 1935, under the provisions of section 1251, Revised Statutes, and the act of Congress approved April 23, 1930, is announced.

Veterinary Reserve Corps

Promotions—

To Lt. Col.: Croll, Forrest Benjamin, 400 Armstrong Ave., Kansas City, Kans.

New acceptances—

Captain:

Reid, Jos. Jenkinson, 304 W. T. Waggoner Bldg., Fort Worth, Tex.

First Lieutenant:

Apple, Henry Jackson, 1037 Chambers Road, Columbus, Ohio.

Attaway, Ray Seaborn, 201 Luckie St., Atlanta, Ga.

Cady, Duane LeRoy, Arlington, Nebr.

Ballenger, Ottis Elmo, 3 Lenchen Apt., Bainbridge, Ga.

Carlin, Max Harold, 569 East 106th St., Cleveland, Ohio.

Calvell, Cesar, P. O. Box 487, Ponce, Puerto Rico.

Corbin, Benj. Frank, 13476 Washington Blvd., Venice, Calif.

Davis, Robert Wilson, 1928 17th St., Bakersfield, Calif.

Fisk, Loyal Harrel, General Delivery, Marshfield, Mo.

Frock, Irvin Warner, Manchester, Md.

Golden, Vernon Verle, 417 Emery St., Longmont, Colo.

Greene James Ethridge, Cody Rd., Columbus, Ga.

Harrison, Joseph Wm., 619 So. Washington St., Denver, Colo.

Howarth, Carl Robert, R. R. No. 2, Box 163, Littleton, Colo.

Inman, Archie Rosevelt, General Delivery, Coalinga, Calif.

Jerstad, Arthur Clifford, Route 2, Box 409, Tacoma, Wash.

Johnson, Harry Wm., 206 Wood St. Urbana, Ill.

Jones, Thomas Carlyle, 1219 Warren St., Boise, Idaho.

Kenaston, Glenn Harry, 5417 N. E. 33rd Ave., Portland, Ore.

Koudelka, Thomas Peter, Reedsville, Wisc.

Lancaster, Harry Ruyle, 326 Post Office Bldg. Baton Rouge, La.

McConnell, Ulysses Stanley, Pierce, Colo.

McCormick, Hugh Collins, 821 Wealthy St., S. E., Grand Rapids, Mich.

McMichael, Wm. Wallace, Paonia, Colo.

Meyer, Josh Forest, Gardner, Colo.

Mencimer, Floyd Robert, 214 North 8th Ave., Brighton, Colo.

Newman, Leonard LaVern, Thorp, Wash.

Nichols, Roy Elwyn, Veterinary Clinic, Ohio St. Univ., Columbus, O.

Peeples, Francis George, 322 13th St., Raymond, Wash.

Ross, Paul Daniel, Otterville, Mo.

Shipley, Wayne Devere, 326 Post Office Bldg., Baton Rouge, La.

Shives, Leo Sigel, Hancock, Md.

Smith, Esmond Verle, 320 4th St., N. W., Puyallup, Wash.

Soderholm, Lawrence Gordon, Bartle Court, Eugene, Ore.

St. Clair, Lorenz Edward, Colo. State College, Fort Collins, Colo.

Tierney, Wm. Francis, 14 Nickerson St., Cazenovia, N. Y.

White, Alfred Everett, Jr., 1743 Fairchild Ave., Manhattan, Kans.

Additions to Active Duty with CCC Since July 1, 1935

First Lieutenants:

First Corps Area

Lieberman, Leo L., Ft. Ethan Allen, Vt.

McDonald, Alvin R., Ft. Devens, Mass.

Phillips, Harry L., Ft. H. G. Wright, N. Y.

Second Corps Area

Shaner, Ralph H., Middletown, N. Y.

Fourth Corps Area

Millenbruck, Edwin L., Hq. 4th C. A., Atlanta, Ga.

Wann, Russell S., Camp Beauregard La.

Fifth Corps Area

Tuttle, Marion F., Ft. Benj. Harrison, Ind.

Eighth Corps Area

Christensen, Nels F., Lubbock Dist., Lubbock, Tex.

McMichael, Wm. W., Ft. Bliss Dist., Ft. Bliss, Tex.

Sample, Fred M., Tyler Dist., Tyler, Tex.

Siemer Everett J., Silver City Dist., Silver City, N. M.

Ninth Corps Area

Jones, Thomas C., Pres. of San Francisco.

Captain:

Andrews, Asa R., Pres. of San Francisco.

More than 150 veterinarians and their wives attended the second annual Nebraska State Veterinary Medical Association meeting at David City, Nebraska, June 27th. Thirty-five horses and mules, 20 head of cattle and a number of hogs, dogs and cats were presented for diagnosis and treatment, some of them coming from long distances.

Credit for the great success of the clinic went to Dr. S. W. Phillips, David City, general chairman, and Dr. R. C. Gilmore, Ulysses, Dr. B. F. Lott, Gresham and Dr. W. H. Boyle, Schuyler, section chairmen of the committee. A picnic dinner was served and there was contract for the ladies in the afternoon.

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EASTERN IOWA MEETING

The 22nd annual meeting of the Eastern Iowa Veterinary Association will be held at the Montrose Hotel, Cedar Rapids, October 15-16, 1935. Among the subjects of general interest listed in the program, are:

President's address, by Dr. Iva Dunn.

Discussion of Bang's Disease, by S. H. McNutt, Iowa State College, and A. L. Bron, Story City, practitioner.

Discussion of Swine Diseases by R. M. Hofferd, U. S. Veterinary Inspector, Hog Cholera Control, Cedar Rapids; W. W. Warnock, Aledo, Ill., practitioner; and Chas. Murray, Experimental Farms, Iowa State College.

Discussion of Diagnosis and Treatment of Clinical Cases, including Sheep, at Iowa State College Clinic, by George R. Fowler, Iowa State College.

Discussion of Poultry Diseases by John R. Christian, Woodhull, Ill., and Willis A. Beard, Greenview, Ill., practitioners.

Question Box by Frank Breed, Lincoln.

Discussion of Small Animal Practice by Earl R. Kennedy, Moline, Ill., practitioner, and J. C. Flynn, Kansas City, president, A. V. M. A.

Discussion of Equine Practice by G. E. Van Tuyl, Paullina, practitioner.

The Value of Manipulation in Diagnosis of Abdominal Maladies, by W. A. Aitken, Merrill.

Discussion of General Cattle Practice, by S. L. Stewart, Olathe, Kan., practitioner.

Question Box by L. A. Merillat.

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The East Central (Iowa) Veterinary Association September dinner-meeting was held at Cedar Rapids, Thursday, Sept. 5, 1935. Thirty-eight practitioners attended from fourteen counties. The technical program was under the auspices of the Jones County group of practitioners. Interesting and informative papers were read, including graphic case reports, by Doctors Kellogg and York, on "Black Scours" of all ages of swine, a malady which is widely distributed in that section of the state.

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It has always been our desire to serve you as good as we possibly can and we are glad to inform you at this time that from now on Gene Moore will assist you with your poultry troubles. Gene has been in Charles City for almost three weeks, taking a complete course in poultry diseases. Feel free to call Gene to help you with any trouble you may have.—*Johnson's Hatchery News.*

Hog cholera of an unusually virulent type, is reported by the press service of the Eastern Iowa Veterinary Association. Vaccination in infected herds has been nearly futile and followed by heavy loss. The outbreaks are widespread, from one to five occurring weekly, in nearly all counties of the eastern third of the state.

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Scientific study of the ultraviruses, which are disease producers so minute that they cannot be seen even with the most powerful microscope, must be done chiefly by observing the phenomena they produce. Nevertheless these studies have resulted in the production of serums and other means of preventing or controlling a number of important livestock diseases. This intriguing field of science was discussed by Dr. John R. Mohler, Chief of the Bureau of Animal Industry, U. S. Department of Agriculture, at the annual banquet of the Washington, D. C. Chapter of the national honorary scientific organization, The Society of the Sigma Xi, May 14, at the University Club. Doctor Mohler was among those elected to membership and in acknowledging the honor responded with a discussion on "Explorations Beyond the Microscope" dealing with the manner in which investigators are extending scientific frontiers.

"Notwithstanding the invisibility and very small size of these living particles," Doctor Mohler explained, "we have means of studying, comparing, and even measuring them. The methods include the ability to pass through collodion membranes of different porosities, the velocity of diffusion in certain liquids, the rate of sedimentation, and other more complex means. The immunity which follows recovery from the filtrable virus diseases has been found, as a rule, to be remarkably durable.

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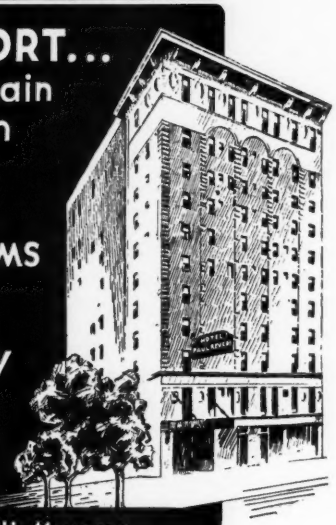

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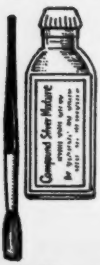

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The Bang's disease eradication program is being carried out on a cooperative basis between the states and the Federal government. The work is conducted by the Bureau of Animal Industry, with funds allotted by the Agricultural Adjustment Administration, under rules and regulations prescribed by the Secretary of Agriculture. Funds for this program were provided by the LaFollette amendment to the Jones-Connally Act which was passed by the Seventy-third Congress. The program was started in July, 1934.

Bang's disease testing in Botetourt County was started in June of this year and completed early in August.

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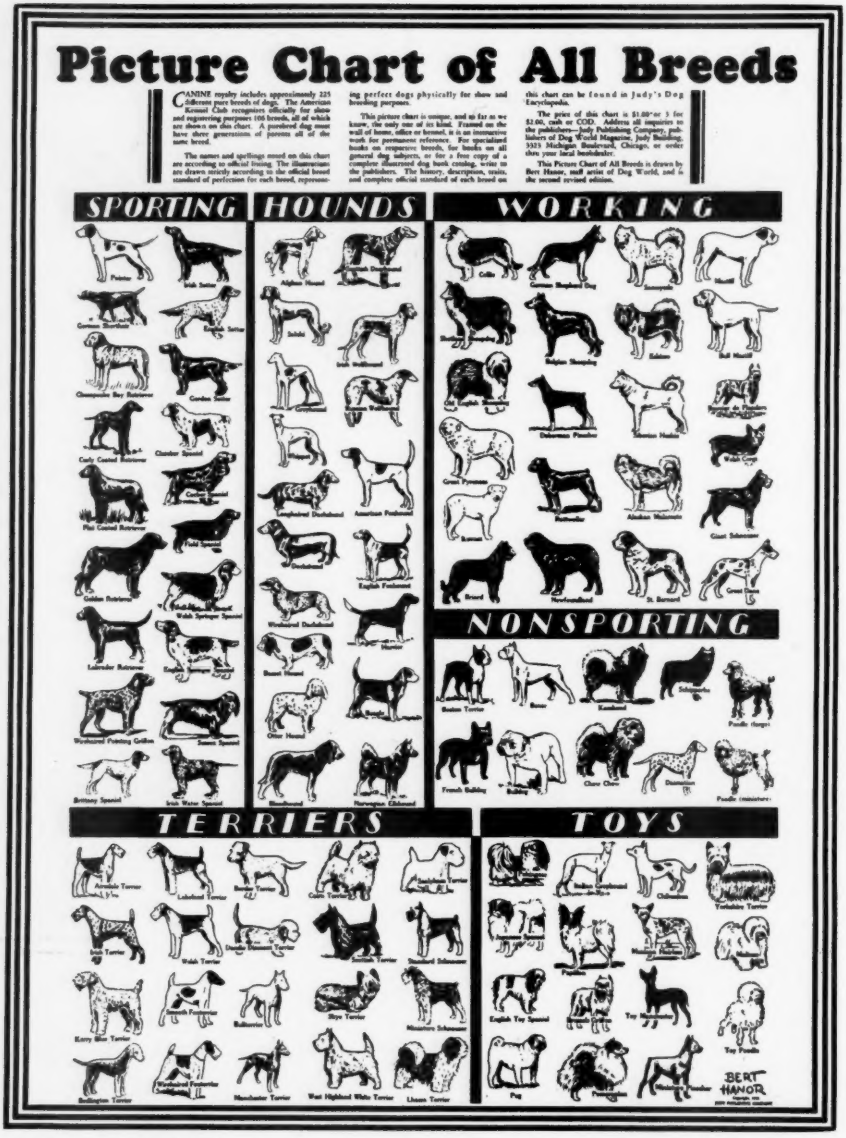
Picture Chart of All Breeds
CANINE royalty includes approximately 225 different pure breeds of dogs. The American Kennel Club recognizes officially for show and registering purposes 106 breeds, all of which are shown on this chart. A purebred dog must have three generations of parents all of the same breed.
The names and spellings used on this chart are according to official listing. The illustrations are drawn strictly according to the official breed standard of perfection for each breed, representing perfect dogs physically for show and breeding purposes.
This picture chart is unique, and as far as we know, the only one of its kind. Framed on the wall of home, office or kennel, it is an instructive work for permanent reference. For specialized books on respective breeds, for books on all general dog subjects, or for a free copy of a complete illustrated dog book catalog, write to the publishers. The history, description, traits, and complete official standard of each breed on this chart can be found in Judy's Dog Encyclopedia.
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Address.....

NORTH CENTRAL IOWA VETERINARY MEDICAL ASSOCIATION

The North Central Iowa Veterinary Medical Association held the largest meeting in its history at Fort Dodge, April 24, 1935. About 200 were in attendance at the afternoon session. The morning session was devoted to the business of the association. In the afternoon a very interesting scientific program was presented, which included an illustrated lecture on cattle practice by W. L. Boyd of St. Paul. A. H. Williams, president of the association presented a paper on botulism.

In the evening, the veterinarians and their wives attended a banquet and dance. Special entertainment was also provided.

Officers for the coming year, are as follows: G. A. Evans, Clarion, president; A. H. Stafford, Renwick, vice-president, and H. C. Smith, Fort Dodge was reelected secretary-treasurer.

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